



Features

- Compliant with OC-3/STM-1, IEEE802.3ah, 100BASE-BX10
- Simplex LC Connector
- Single 3.3V Supply
- 23.2 dB Minimum Power Budget
- 40km Typical Reach
- Commercial Temperature Available (-CxA)
- Industrial Temperature Available (-TxA)
- 1550 nm DFB Laser
- SFP MSA SFF-8074i Compliant
- Digital Diagnostic SFF-8472 Compliant
- Telcordia GR-468 Compliant
- Color Coded Bail Latch Tube: Yellow
- RoHS Compliant

Table 1 – General Operating

| Parameter | Symbol | Min. | Typical | Max. | Unit | Notes |
|------------------------------|------------------|-------|---------|-------|-------|-------|
| Supply Voltage | Vcc | 3.135 | 3.3 | 3.465 | V | |
| Total Current | | - | - | 300 | mA | |
| Power Supply Noise Rejection | PSR | 100 | - | - | mVp-p | |
| Operating Temperature (Case) | T _{opr} | -5 | - | 70 | °C | |
| Operating Temperature (Case) | T _{opr} | -40 | - | 85 | °C | |
| Storage Temperature | T _{stg} | -40 | - | 85 | °C | |
| Data Rate | DR | 10 | - | 155 | Mbps | |

Table 2 – Transmitter Specifications (Optical)

| Parameter | Symbol | Min. | Typical | Max. | Unit | Notes |
|-------------------------------|--------------------------------|--------------------------------------|---------|------|-------|-------|
| Optical Power | P _{op} | -5 | -2.5 | 0 | dBm | |
| Optical Crosstalk | XT | - | -45 | -40 | dB | |
| Average Launch Power Tx_Off | P _{off} | - | - | -45 | dBm | |
| Extinction Ratio | ER | 6.6 | - | - | dB | |
| Eye Mask | | IEEE 802.3ah and SONET/SDH Compliant | | | | |
| Optical Rise/Fall Time | t _r /t _f | - | - | 2 | ns | 1 |
| Mean Wavelength | λ | 1500 | 1550 | 1600 | nm | |
| Maximum RMS Width | σ | - | - | 1 | nm | |
| Relative Intensity Noise | RIN | - | - | -120 | dB/Hz | |
| Optical Return Loss Tolerance | ORLT | - | - | 12 | dB | |

Note 1: 20% to 80% values

Table 3 – Transmitter Specifications (Electrical)

| Parameter | Symbol | Min. | Typical | Max. | Unit | Notes |
|------------------------------------|---------------|------|---------|-----------|----------|-------|
| 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 | - | Vcc | V | |
| TxFault_Normal | V_{normal} | Vee | - | Vee + 0.5 | V | |
| TxDisable_Disable | V_d | 2 | - | Vcc | V | |
| TxDisable_Enable | V_{en} | Vee | - | Vee + 0.8 | V | |

Table 4 – Receiver Specifications (Optical)

| Parameter | Symbol | Min. | Typical | Max. | Unit | Notes |
|-------------------------------|------------------|------|---------|-------|------|-------|
| Receiver Power Low | $R_{sens,low}$ | - | -30 | -28.2 | dBm | 2 |
| Receiver Power High | $R_{sens,high}$ | -8 | - | - | dBm | |
| Damage Threshold For Receiver | $P_{in, damage}$ | 4 | - | - | dBm | |
| Wavelength | λ | 1260 | - | 1360 | nm | |
| LOS Assert | - | -45 | - | - | dBm | |
| LOS De-Assert | - | - | - | -28.2 | dBm | |
| LOS Hysteresis | - | 0.5 | - | - | dB | |

Note 2: Measured at 10^{-12} BER, PRBS 2^7-1

Table 5 – Receiver Specifications (Electrical)

| Parameter | Symbol | Min. | Typical | Max. | Unit | Notes |
|-------------------------------------|---------------|------|---------|------|------|-------|
| PECL Single Ended Data Output Swing | $V_{out,p-p}$ | 185 | - | 800 | mV | |
| Data Output Rise/Fall Time | t_r/t_f | - | - | 2 | ns | |

Table 6 – Timing and Electrical

| Parameter | Symbol | Min. | Typical | Max. | Unit | Notes |
|---|-------------------------|-----------------|---------|-----------------------|------|-------|
| Tx Disable Negate Time | t_on | - | - | 25 | ms | |
| Tx Disable Assert Time | t_off | - | - | 10 | µs | |
| Time to Initialize, Including Reset of Tx Fault | t_init | - | - | 300 | ms | |
| Tx Fault Assert Time | t_fault | - | - | 100 | µs | |
| Tx Disable to Reset | t_reset | 10 | - | - | µs | |
| LOS Assert Time | t_loss_on | - | - | 300 | µs | |
| LOS De-Assert Time | t_loss_off | - | - | 100 | µs | |
| Serial ID Clock Rate | f_serial_clock | - | - | 100 | kHz | |
| RX_LOS Voltage (High) | Rx_LOS _H | 2 | - | - | 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 | |

Table 7 – Diagnostics

| Parameter | Range | Accuracy | Unit | Calibration | Formula |
|-------------------|----------------------|----------|------|-------------|--|
| Temperature(-CDA) | -5 to 70 | ±3 | °C | External | Tc(C) = Tslope* <i>T</i> ad(16 bit signed twos complement value) + Toffset |
| Temperature(-TDA) | -40 to 85 | ±3 | °C | External | Tc(C) = Tslope* <i>T</i> ad(16 bit signed twos complement value) + Toffset |
| Voltage | 0 to V _{cc} | 0.1 | V | External | V(Volts) = Vslope* <i>V</i> ad (16 bit unsigned integer) + Voffset |
| Bias Current | 0 to 120 | 5 | mA | External | I(mA) = Islope * Iad(16 bit unsigned integer) + Ioffset |
| Tx Power | -5 to 0 | ±3 | dBm | External | Tx_PWR(µW) = Tx_PWRslope*Tx_PWRad (16 bit unsigned integer)+Tx_PWRoffset |
| Rx Power | -28.2 to -8 | ±3 | dBm | External | Rx_PWR(µW) = A0+A1*x+A2*x^2+A3*x^3+A4*x^4 |

Table 8 – EEPROM Serial ID (A0h)

| Name of Field | Description of Field | Address | Hex | ASCII |
|-----------------|--|---------|-----|-------|
| Identifier | Type of serial transceiver | 0 | 03 | |
| Ext. Identifier | Extended identifier of type of serial transceiver | 1 | 04 | |
| Connector | Code for connector type | 2 | 07 | |
| Transceiver | Code for electronic compatibility or optical compatibility | 3 | 00 | |
| | | 4 | 00 | |
| | | 5 | 00 | |
| | | 6 | 40 | |
| | | 7 | 00 | |
| | | 8 | 00 | |
| | | 9 | 00 | |
| 10 | 00 | | | |
| Encoding | Code for serial encoding algorithm | 11 | 02 | |
| BR.Nominal | Units of 100 MBits/sec. | 12 | 01 | |
| Reserved | Reserved | 13 | 00 | |
| Length (9µm,km) | 9/125 µm fiber, units of km | 14 | 28 | |
| Length (9µm) | 9/125 µm fiber, units of 100 m | 15 | FF | |
| Length (50µm) | 50/125 µm fiber, units of 10 m | 16 | 00 | |
| Length (62.5µm) | 62.5/125 µm fiber, units of 10 m | 17 | 00 | |
| Length (Copper) | Units of meters | 18 | 00 | |
| Reserved | Reserved | 19 | 00 | |
| Vendor Name | SFP vendor name (ASCII) | 20 | 53 | S |
| | | 21 | 4F | O |
| | | 22 | 55 | U |
| | | 23 | 52 | R |
| | | 24 | 43 | C |
| | | 25 | 45 | E |
| | | 26 | 50 | P |
| | | 27 | 48 | H |
| | | 28 | 4F | O |
| | | 29 | 54 | T |
| | | 30 | 4F | O |
| | | 31 | 4E | N |
| | | 32 | 49 | I |
| | | 33 | 43 | C |
| | | 34 | 53 | S |
| 35 | 20 | [Space] | | |

Table 8 – EEPROM Serial ID (A0h)

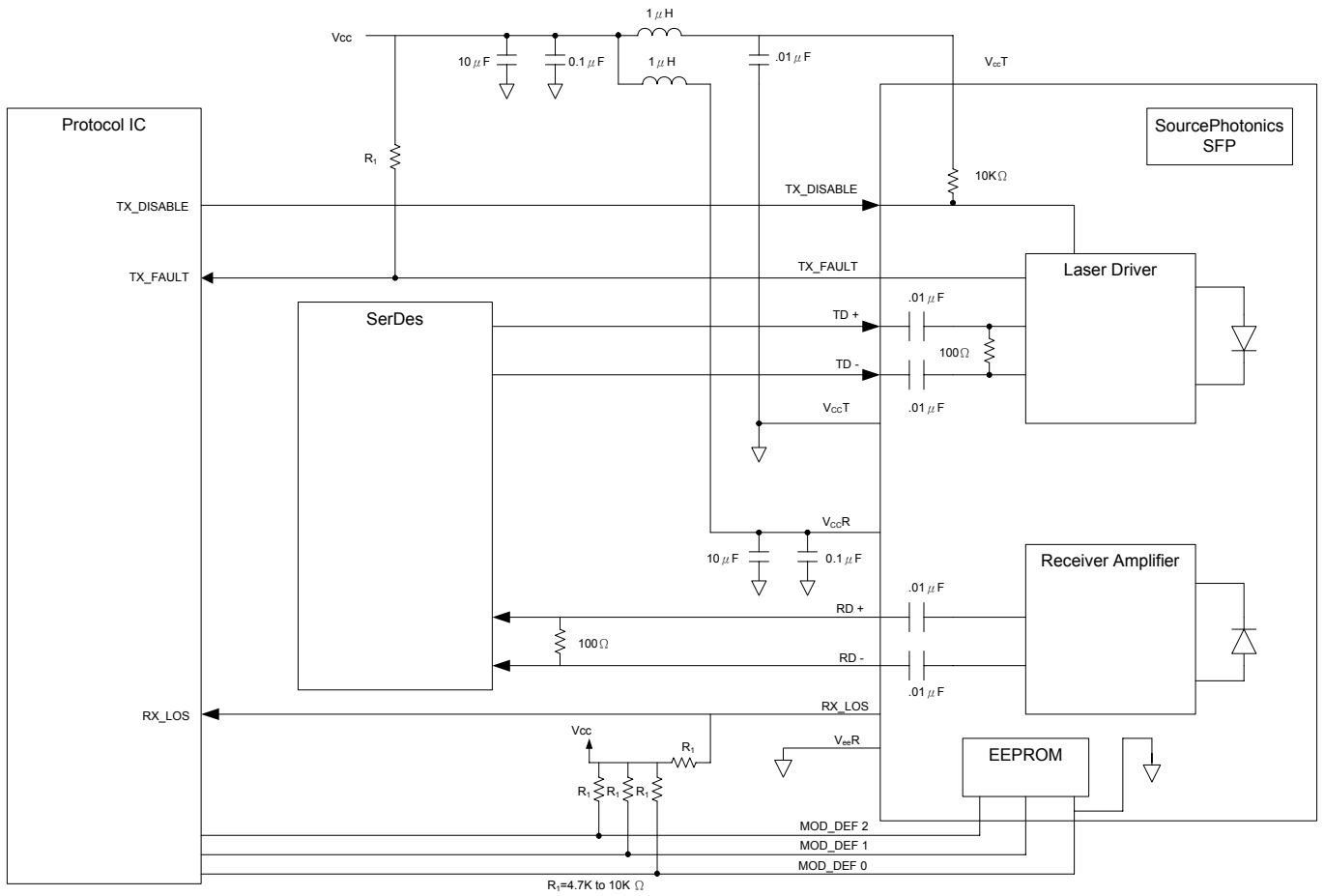
| Name of Field | Description of Field | Address | Hex | ASCII |
|---------------|---|---------|-----|---------|
| Reserved | Reserved | 36 | 00 | |
| Vendor OUI | SFP vendor IEEE company ID for Source Photonics Inc. | 37 | 00 | |
| | | 38 | 1F | |
| | | 39 | 22 | |
| Vendor P/N | Part number in ASCII, e.g. SPL53FEBDCDA | 40 | 53 | S |
| | | 41 | 50 | P |
| | | 42 | 4C | L |
| | | 43 | 35 | 5 |
| | | 44 | 33 | 3 |
| | | 45 | 46 | F |
| | | 46 | 45 | E |
| | | 47 | 42 | B |
| | | 48 | 44 | D |
| | | 49 | 43 | C |
| | | 50 | 44 | D |
| | | 51 | 41 | A |
| | | 52 | 20 | [Space] |
| 53 | 20 | [Space] | | |
| 54 | 20 | [Space] | | |
| 55 | 20 | [Space] | | |
| Vendor Rev. | Revision level for part number provide by vendor (ASCII) | 56 | 41 | A |
| | | 57 | 20 | [Space] |
| | | 58 | 20 | [Space] |
| | | 59 | 20 | [Space] |
| Wavelength | Laser Wavelength, 1550nm | 60 | 06 | |
| | | 61 | 0E | |
| Reserved | Reserved | 62 | 00 | |
| CC_BASE | Check code for Base ID Fields (addresses 0 to 62) | 63 | xx | |
| Options | Indicates which optional transceiver signals are implemented | 64 | 00 | |
| | | 65 | 1A | |

Table 8 – EEPROM Serial ID (A0h)

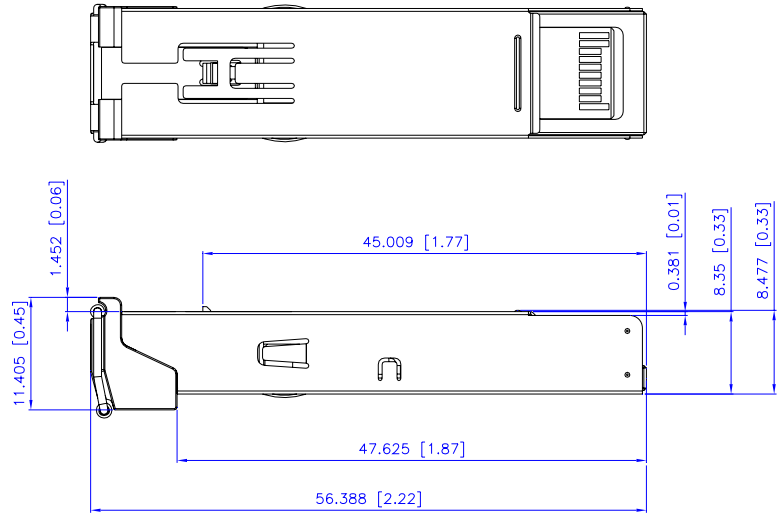
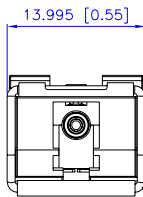
| Name of Field | Description of Field | Address | Hex | ASCII |
|----------------------------|---|---------|-----|-------|
| BR, max | Upper bit rate margin, unit of % | 66 | 00 | |
| BR, min | Lower bit rate margin, unit of % | 67 | 00 | |
| | | | | |
| Vendor S/N | Serial number | 68-83 | xx | |
| | | | | |
| Date Code | Vendor's manufacturing date code | 84-91 | xx | |
| | | | | |
| Diagnostic Monitoring Type | Indicates which type of diagnostic monitoring is implemented in the transceiver | 92 | 58 | |
| Enhanced Options | Indicates which optional enhanced features are implemented in the transceiver | 93 | B0 | |
| SFF-8472 Compliance | Indicates which revision of SFF-8472 the transceiver complies with | 94 | 02 | |
| | | | | |
| CC_EXT | Check code for Extended ID Fields (addresses 64 to 94) | 95 | xx | |
| | | | | |
| Vendor Specific | Vendor Specific EEPROM | 96-127 | xx | |

Table 9 – Pin Definitions

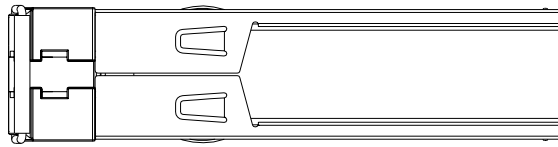
| Pin | Unit | Notes |
|-----|------------|------------------------|
| 1 | VeeT | TX GND |
| 2 | TX_FAULT | Open Collector |
| 3 | TX_DISABLE | Internally Pulled High |
| 4 | MOD_DEF2 | Serial Data Input |
| 5 | MOD_DEF1 | Serial Clock Input |
| 6 | MOD_DEF0 | Internally Grounded |
| 7 | NC | Not Connected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

Recommended Interface Circuit


Mechanical Diagram



Units in mm (inch)

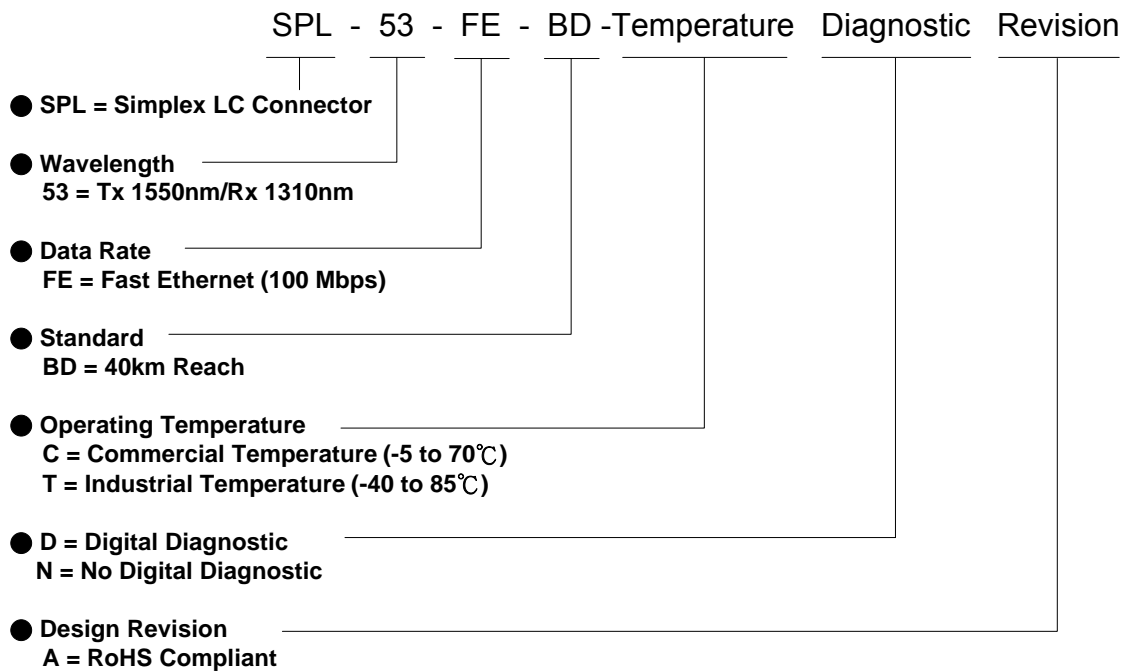


Order Information

Table 10 – Order Information

| Part No. | Part No. |
|------------------|------------------|
| SPL-53-FE-BD-CDA | SPL-53-FE-BD-CNA |
| SPL-53-FE-BD-TDA | SPL-53-FE-BD-TNA |

Part Numbering Definition:



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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