

155M~2.67Gbps Spring-latch SFP Transceiver

(For 18/28dB minimum link budget)

Members of Flexon™ Family

- ◆ Compatible with FDA 21 CFR 1040.10 and 1040.11, Class I
- ◆ Compatible with ITU-T G.694.2
- ◆ Compatible with ITU-T G.695
- ◆ RoHS compliant



Features

- ◆ Multi-rate operation from 155Mbps to 2.67Gbps
- ◆ Uncooled DFB laser transmitter
- ◆ Eight CWDM wavelengths available
- ◆ Multi-source package with LC optical interface
- ◆ With Spring latch for high density application
- ◆ Color coded lever for different wavelengths
- ◆ Class 1 laser product
- ◆ Very low jitter
- ◆ 18/28dB minimum link budget
- ◆ Single +3.3V power supply
- ◆ Hot-pluggable capability
- ◆ Monitoring interface compatible with SFF-8472
- ◆ Operating temperature 0°C to +70°C

Applications

Optical communication in Metro/Access Networks:

- ◆ 1×/2× Fiber Channel
- ◆ Gigabit Ethernet
- ◆ SDH/SONET/ATM
- ◆ Other optical links

Standard

- ◆ Compatible with SFP MSA
- ◆ Compatible with SFF-8472
- ◆ Compatible with FCC 47 CFR Part 15, Class B

Description

FTM-6128C-SLxxxxG is designed for Coarse Wavelength Division Multiplexing (CWDM) applications at data rates from 155Mbps to 2.67Gbps. There are eight centre wavelengths available at present: 1471nm, 1491nm, 1511nm, 1531nm, 1551nm, 1571nm, 1591nm and 1611nm, compatible with ITU-T G.694.2. It offers a guaranteed minimum optical link budget of 18 or 28dB.

The transmitter section of FTM-6128C-SLxxxxG incorporates a highly reliable uncooled DFB laser and the receiver section utilizes a PIN/APD receiver. All modules satisfy Class 1 Laser Safety requirements.

FTM-6128C-SLxxxxG provides an enhanced monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage. It also defines a sophisticated system of alarm and warning flags, which alerts end-users when particular operating parameters are outside of a factory set normal range.

FTM-6128C-SLxxxxG is compliant with RoHS.

Regulatory Compliance

The transceivers have been tested according to American and European product safety and electromagnetic compatibility regulations (See Table 1). For further information regarding regulatory certification, please refer to Fiberxon regulatory specification and safety guidelines, or contact with Fiberxon, Inc. America sales office listed at the end of documentation.

Table 1 - Regulatory Compliance

| Feature | Standard | Performance |
|---|--|--|
| Electrostatic Discharge (ESD) to the Electrical Pins | MIL-STD-883E Method 3015.7 | Class 2(>2000 V) |
| Electrostatic Discharge (ESD) to the Duplex LC Receptacle | IEC 61000-4-2 GR-1089-CORE | Compatible with standards |
| Electromagnetic Interference (EMI) | FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B | Compatible with standards |
| Immunity | IEC 61000-4-3 | Compatible with standards |
| Laser Eye Safety | FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2 | Compatible with Class 1 laser product. |
| Component Recognition | UL and CSA | Compliant with standards |
| RoHS | 2002/95/EC 4.1&4.2 2005/747/EC | Compliant with standards ^{note} |

Note:

In light of item 5 in Annex of 2002/95/EC, "Pb in the glass of cathode ray tubes, electronic components and fluorescent tubes." and item 13 in Annex of 2005/747/EC, "Lead and cadmium in optical and filter glass.", the two exemptions are being concerned for Fiberxon's transceivers, because Fiberxon's transceivers use glass, which may contain Pb, for components such as lenses, windows, isolators, and other electronic components.

Absolute Maximum Ratings

Stress in excess of the maximum absolute ratings can cause permanent damage to the module.

Table 2 - Absolute Maximum Ratings

| Parameter | Symbol | Min. | Max. | Unit |
|-----------------------------|-------------------|-----------|------|------|
| Storage Temperature | T_s | -40 | +85 | °C |
| Supply Voltage | V_{CC} | -0.5 | 3.6 | V |
| Operating Relative Humidity | - | 5 | 95 | % |
| Input Optical Power | FTM-6128C-SL50xxG | P_{max} | +3 | dBm |
| | FTM-6128C-SL80xxG | | -3 | |

Recommended Operating Conditions

Table 3- Recommended Operating Conditions

| Parameter | Symbol | Min. | Typical | Max. | Unit |
|----------------------------|----------|------|---------|------|------|
| Operating Case Temperature | T_c | 0 | | +70 | °C |
| Power Supply Voltage | V_{CC} | 3.13 | | 3.47 | V |
| Power Supply Current | I_{CC} | | | 300 | mA |
| Data Rate | | 155 | | 2670 | Mbps |

Optical and Electrical Characteristics

All parameters are specified at overall operating case temperature and power supply range, unless otherwise stated.

FTM-6128C-SL50xxG (DFB and PIN, 18dB Min. link budget, Monitoring function)

Table 4 - Optical and Electrical Characteristics

| Parameter | Symbol | Min. | Typical | Max. | Unit | Notes | |
|-------------------------------|-----------------|-----------------------|---------|--------------|----------|-------|---|
| Transmitter | | | | | | | |
| Centre Wavelength | λ_c | x-6.5 | x | x+6.5 | nm | 1 | |
| Spectral Width (-20dB) | $\Delta\lambda$ | | | 1 | nm | | |
| Average Output Power | P_{out} | 0 | | 5 | dBm | 2 | |
| Side Mode Suppression Ratio | SMSR | 30 | | | dB | | |
| Extinction Ratio | EX | 8.2 | | | dB | | |
| Relative Intensity Noise | RIN | | | -120 | dB/Hz | | |
| $P_{out}@TX$ Disable Asserted | | | | -45 | dBm | | |
| Optical Path Penalty | | | | 1.5 | dB | 9 | |
| Jitter Generation (RMS) | | | | 0.01 | UI | 3 | |
| Jitter Generation (pk-pk) | | | | 0.1 | UI | 3 | |
| Output Optical Eye | | ITU-T G.957 compliant | | | | | 3 |
| Differential Data Input Swing | V_{IN} | 500 | | 2400 | mV | 4 | |
| Input Differential Impedance | Z_{IN} | 85 | 100 | 115 | Ω | | |
| TX Disable | Disable | 2.0 | | V_{cc} | V | 5 | |
| | Enable | 0 | | 0.8 | V | | |
| TX Fault | Fault | 2.0 | | $V_{cc}+0.3$ | V | | |
| | Normal | 0 | | 0.8 | V | | |
| Receiver | | | | | | | |
| Centre Wavelength | λ_c | 1270 | | 1620 | nm | 6 | |
| Receiver Sensitivity | 2.488Gbps | | | -18 | dBm | 7 | |
| | 2.125Gbps | | | -18 | | 8 | |
| | 1.0625/1.25Gbps | | | -19 | | | |
| Receiver Overload | | 0 | | | dBm | | |
| Reflection | | | | -27 | dB | | |
| LOS De-Assert | LOS_D | | | -19 | dBm | | |
| LOS Assert | LOS_A | -35 | | | dBm | | |

| | | | | | | | |
|--------------------------------|------|-----------|-----|--|--------------|----|----|
| LOS Hysteresis | | | 0.5 | | 4.5 | dB | |
| Differential Data Output Swing | | V_{OUT} | 400 | | 1200 | mV | 10 |
| LOS | High | | 2.0 | | $V_{CC}+0.3$ | V | |
| | Low | | 0 | | 0.8 | V | |

Notes:

1. "x" can be specified by the customer. The current available wavelength are: 1471, 1491, 1511, 1531, 1551, 1571, 1591, 1611nm.
2. The optical power is launched into 9/125 SMF.
3. Measured with a PRBS $2^{23}-1$ test pattern @2.488Gbps.
4. Internally AC-coupled.
5. If Pin 3 (TX Disable) is left open, TX is disabled
6. The 1610nm signal can also be received while the sensitivity is degraded.
7. Worst-case condition, measured with a PRBS $2^{23}-1$ test pattern, BER better than or equal to 1×10^{-10} .
8. Worst-case condition, measured with a PRBS 2^7-1 test pattern, BER better than or equal to 1×10^{-12} .
9. It is for 50km transmission over G.652 SMF, measured with a PRBS $2^{23}-1$ test pattern @2.488Gbps, BER better than or equal to 1×10^{-10} .
10. AC-coupled CML logic family.

FTM-6128C-SL80xxG (DFB and APD, 28dB Min. link budget, Monitoring function)**Table 5 - Optical and Electrical Characteristics**

| Parameter | Symbol | Min. | Typical | Max. | Unit | Notes |
|--------------------------------|-----------------------|-------|---------|--------------|----------|-------|
| Transmitter | | | | | | |
| Centre Wavelength | λ_C | x-6.5 | x | x+6.5 | nm | 1 |
| Spectral Width (-20dB) | $\Delta\lambda$ | | | 1 | nm | |
| Average Output Power | P_{Out} | 0 | | 5 | dBm | 2 |
| Side Mode Suppression Ratio | SMSR | 30 | | | dB | |
| Extinction Ration | EX | 8.2 | | | dB | |
| Relative Intensity Noise | RIN | | | -120 | dB/Hz | |
| P_{Out} @TX Disable Asserted | | | | -45 | dBm | |
| Optical Path Penalty | | | | 2.5 | dB | 9 |
| Jitter Generation (RMS) | | | | 0.01 | UI | 3 |
| Jitter Generation (pk-pk) | | | | 0.1 | UI | 3 |
| Output Optical Eye | ITU-T G.957 compliant | | | | | 3 |
| Differential Data Input Swing | V_{IN} | 500 | | 2400 | mV | 4 |
| Input Differential Impedance | Z_{IN} | 85 | 100 | 115 | Ω | |
| TX Disable | Disable | 2.0 | | V_{CC} | V | 5 |
| | Enable | 0 | | 0.8 | V | |
| TX Fault | Fault | 2.0 | | $V_{CC}+0.3$ | V | |
| | Normal | 0 | | 0.8 | V | |
| Receiver | | | | | | |

| | | | | | | |
|--------------------------------|-----------------|------------------|------|----------------------|-----|----|
| Centre Wavelength | | λ_C | 1270 | 1620 | nm | 6 |
| Receiver Sensitivity | 2.488Gbps | | | -28 | dBm | 7 |
| | 2.125Gbps | | | -28 | | 8 |
| | 1.0625/1.25Gbps | | | -29 | | |
| Receiver Overload | | | -9 | | dBm | |
| Reflection | | | | -27 | dB | |
| LOS De-Assert | | LOS _D | | -29 | dBm | |
| LOS Assert | | LOS _A | -45 | | dBm | |
| LOS Hysteresis | | | 0.5 | 4.5 | dB | |
| Differential Data Output Swing | | V _{OUT} | 400 | 1200 | mV | 10 |
| LOS | High | | 2.0 | V _{CC} +0.3 | V | |
| | Low | | 0 | 0.8 | V | |

Notes:

1. "x" can be specified by the customer. The current available wavelengths are: 1471, 1491, 1511, 1531, 1551, 1571, 1591, 1611nm.
2. The optical power is launched into 9/125 SMF.
3. Measured with a PRBS 2²³-1 test pattern @2.488Gbps.
4. Internally AC-coupled.
5. If Pin 3 (TX Disable) is left open, TX is disabled
6. The 1610nm signal can also be received while the sensitivity is degraded.
7. Worst-case condition, measured with a PRBS 2²³-1 test pattern, BER better than or equal to 1 × 10⁻¹⁰
8. Worst-case condition, measured with a PRBS 2⁷-1 test pattern, BER better than or equal to 1 × 10⁻¹²
9. It is for 80km transmission over G.652 SMF, measured with a PRBS 2²³-1 test pattern @2.488Gbps, BER better than or equal to 1 × 10⁻¹⁰.
10. AC-coupled CML logic family.

EEPROM Information

The SFP MSA defines a 256-byte memory map in EEPROM describing the transceiver's capabilities, standard interfaces, manufacturer, and other information, which is accessible over a 2 wire serial interface at the 8-bit address 1010000X (A0h). The memory contents refer to Table 6.

Table 6 - EEPROM Serial ID Memory Contents (A0h)

| Addr. | Field Size (Bytes) | Name of Field | Hex | Description |
|-------|--------------------|-----------------|-------------------------|--|
| 0 | 1 | Identifier | 03 | SFP |
| 1 | 1 | Ext. Identifier | 04 | MOD4 |
| 2 | 1 | Connector | 07 | LC |
| 3—10 | 8 | Transceiver | 00 0x 00 02 12 00 01 05 | OC 48, intermediate or long reach, 1000BASE-LX, 1/2 FC. Where x could be A or C. A for 50km and C for 80km |
| 11 | 1 | Encoding | 03 | NRZ |
| 12 | 1 | BR, nominal | 18 | 2.488Gbps |

| | | | | |
|--------|-----|------------------|--|--|
| 13 | 1 | Reserved | 00 | |
| 14 | 1 | Length (9um)-km | xx | 50km/80km(32/50) |
| 15 | 1 | Length (9um) | xx | 50km/80km(FF/FF) |
| 16 | 1 | Length (50um) | 00 | |
| 17 | 1 | Length (62.5um) | 00 | |
| 18 | 1 | Length (copper) | 00 | |
| 19 | 1 | Reserved | 00 | |
| 20—35 | 16 | Vendor name | 46 49 42 45 52 58 4F 4E 20 49 4E 43 2E 20 20 20 | “FIBERXON INC. “(ASC II) |
| 36 | 1 | Reserved | 00 | |
| 37—39 | 3 | Vendor OUI | 00 00 00 | |
| 40—55 | 16 | Vendor PN | 36 31 32 38 43 2D 53 4C xx xx xx xx 47 20 20 20 | “FTM-6128C-SLxxxxG ” (ASC II) |
| 56—59 | 4 | Vendor rev | xx xx 20 20 | ASC II (“31 30 20 20” means 1.0 revision) |
| 60—61 | 2 | Wavelength | xx xx | From 1471nm~1611nm |
| 62 | 1 | Reserved | | |
| 63 | 1 | CC BASE | xx | Check sum of bytes 0 - 62 |
| 64—65 | 2 | Options | 00 1A | LOS, TX_FAULT and TX_DISABLE |
| 66 | 1 | BR, max | 00 | |
| 67 | 1 | BR, min | 00 | |
| 68—83 | 16 | Vendor SN | xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx | ASC II , used for Fiberxon SFPs |
| 84—91 | 8 | Vendor date code | xx xx xx xx xx xx 20 20 | Year (2 bytes, Month (2 bytes), Day (2 bytes) |
| 92 | 1 | Diagnostic type | xx | Diagnostics |
| 93 | 1 | Enhanced option | B0 | Diagnostics (Optional Alarm/warning flags, Soft TX_FAULT , Soft TX_LOS monitoring) |
| 94 | 1 | SFF-8472 | 02 | Diagnostics (SFF-8472 Rev 9.4) |
| 95 | 1 | CC EXT | xx | Check sum of bytes 64 - 94 |
| 96—255 | 160 | Vendor specific | | |

Note: The “xx” byte should be filled in according to practical case. For more information, please refer to the related document of *SFP Multi-Source Agreement (MSA)*.

Monitoring Specification

The digital diagnostic monitoring interface also defines another 256-byte memory map in EEPROM, which makes use of the 8 bit address 1010001X (A2h). Please see Figure 1. For detail EEPROM information, please refer to the related document of SFF-8472 Rev 9.5. The monitoring specification of this product is described in Table 7.

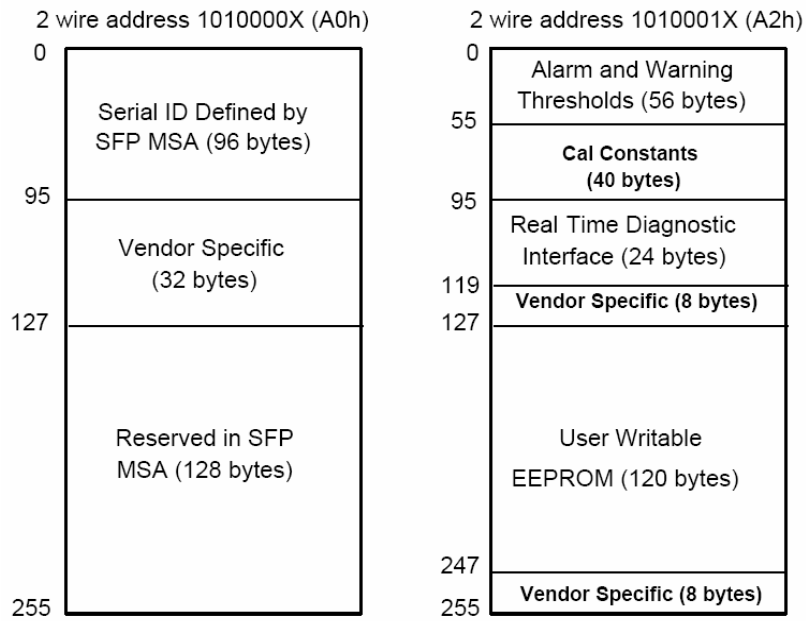


Figure 1, EEPROM Memory Map Specific Data Field Descriptions

Table 7- Monitoring Specification

| Parameter | | Range | Accuracy | Calibration |
|--------------|-------------------|--------------|----------|-------------|
| Temperature | FTM-6128C-SL50xxG | -10 to 80°C | ±3°C | Internal |
| | FTM-6128C-SL80xxG | | | External |
| Voltage | FTM-6128C-SL50xxG | 3.0 to 3.6V | ±3% | Internal |
| | FTM-6128C-SL80xxG | | | External |
| Bias Current | FTM-6128C-SL50xxG | 0 to 100mA | ±10% | Internal |
| | FTM-6128C-SL80xxG | | | External |
| TX Power | FTM-6128C-SL50xxG | -1 to 6dBm | ±3dB | Internal |
| | FTM-6128C-SL80xxG | | | External |
| RX Power | FTM-6128C-SL50xxG | -20 to 1dBm | ±3dB | Internal |
| | FTM-6128C-SL80xxG | -30 to -8dBm | | External |

Recommended Host Board Power Supply Circuit

Figure 2 shows the recommended host board power supply circuit.

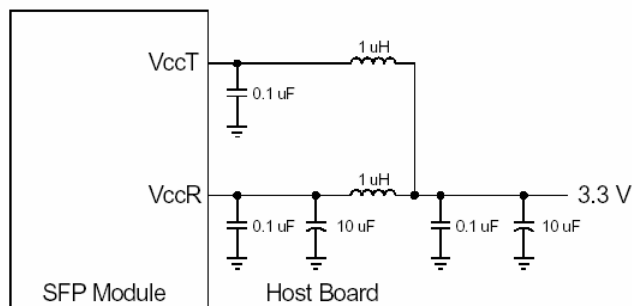


Figure 2, Recommended Host Board Power Supply Circuit

Recommended Interface Circuit

Figure 3 shows the recommended interface circuit.

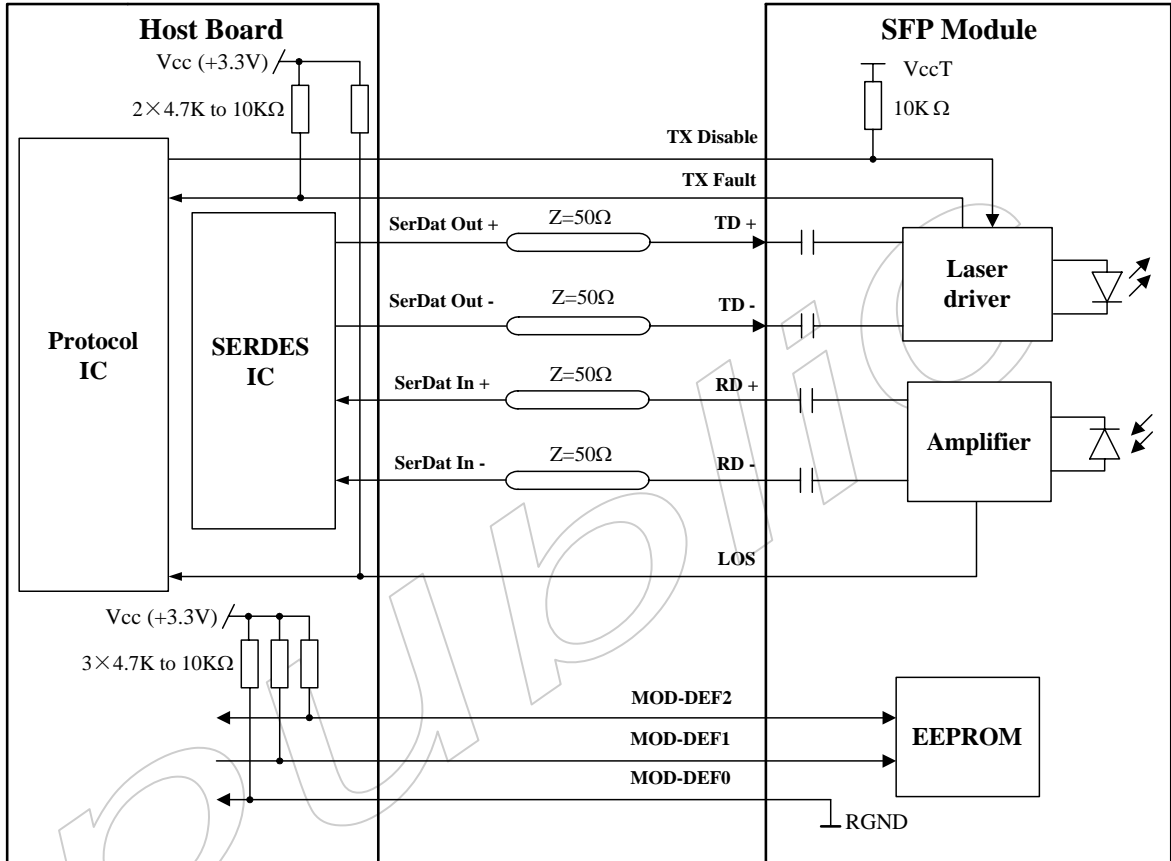


Figure 3, Recommended Interface Circuit

Pin Definitions

Figure 4 below shows the pin numbering of SFP electrical interface. The pin functions are described in Table 8 with some accompanying notes.

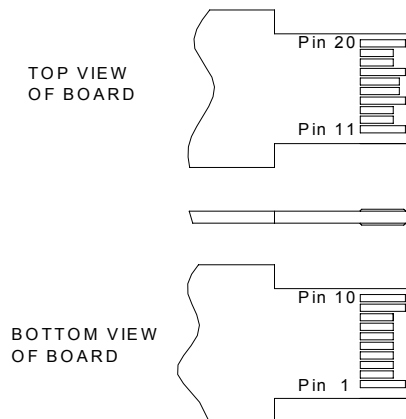


Figure 4, Pin View

Table 8– Pin Function Definitions

| Pin No. | Name | Function | Plug Seq. | Notes |
|---------|-------------|------------------------------|-----------|--------|
| 1 | VeeT | Transmitter Ground | 1 | |
| 2 | TX Fault | Transmitter Fault Indication | 3 | Note 1 |
| 3 | TX Disable | Transmitter Disable | 3 | Note 2 |
| 4 | MOD-DEF2 | Module Definition 2 | 3 | Note 3 |
| 5 | MOD-DEF1 | Module Definition 1 | 3 | Note 3 |
| 6 | MOD-DEF0 | Module Definition 0 | 3 | Note 3 |
| 7 | Rate Select | Not Connected | 3 | |
| 8 | LOS | Loss of Signal | 3 | Note 4 |
| 9 | VeeR | Receiver Ground | 1 | |
| 10 | VeeR | Receiver Ground | 1 | |
| 11 | VeeR | Receiver Ground | 1 | |
| 12 | RD- | Inv. Received Data Out | 3 | Note 5 |
| 13 | RD+ | Received Data Out | 3 | Note 5 |
| 14 | VeeR | Receiver Ground | 1 | |
| 15 | VccR | Receiver Power | 2 | |
| 16 | VccT | Transmitter Power | 2 | |
| 17 | VeeT | Transmitter Ground | 1 | |
| 18 | TD+ | Transmit Data In | 3 | Note 6 |
| 19 | TD- | Inv. Transmit Data In | 3 | Note 6 |
| 20 | VeeT | Transmitter Ground | 1 | |

Notes:

- 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.
- TX Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7k~10kΩ resistor. Its states are:

| | |
|--------------------|----------------------|
| Low (0~0.8V): | Transmitter on |
| (>0.8V, <2.0V): | Undefined |
| High (2.0~3.465V): | Transmitter Disabled |
| Open: | Transmitter Disabled |
- MOD-DEF 0,1,2 are the module definition pins. They should be pulled up with a 4.7k~10kΩ resistor on the host board. The pull-up voltage shall be VccT or VccR.
 MOD-DEF 0 is grounded by the module to indicate that the module is present
 MOD-DEF 1 is the clock line of two wires serial interface for serial ID
 MOD-DEF 2 is the data line of two wires serial interface for serial ID
- LOS 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 loss of signal. In the low state, the output will be pulled to less than 0.8V.
- These are the differential receiver output. They are internally AC-coupled 100Ω differential lines which should be terminated with 100Ω (differential) at the user SERDES.

6. These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module.

Mechanical Design Diagram

The mechanical design diagram is shown in Figure 5.

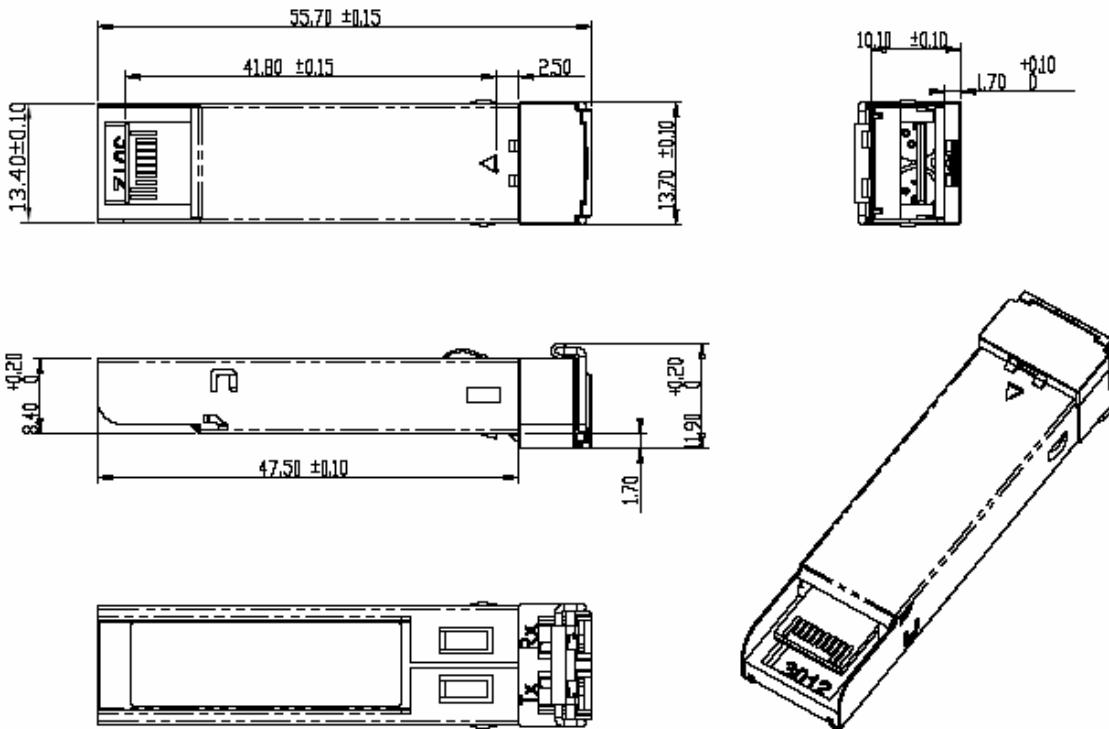
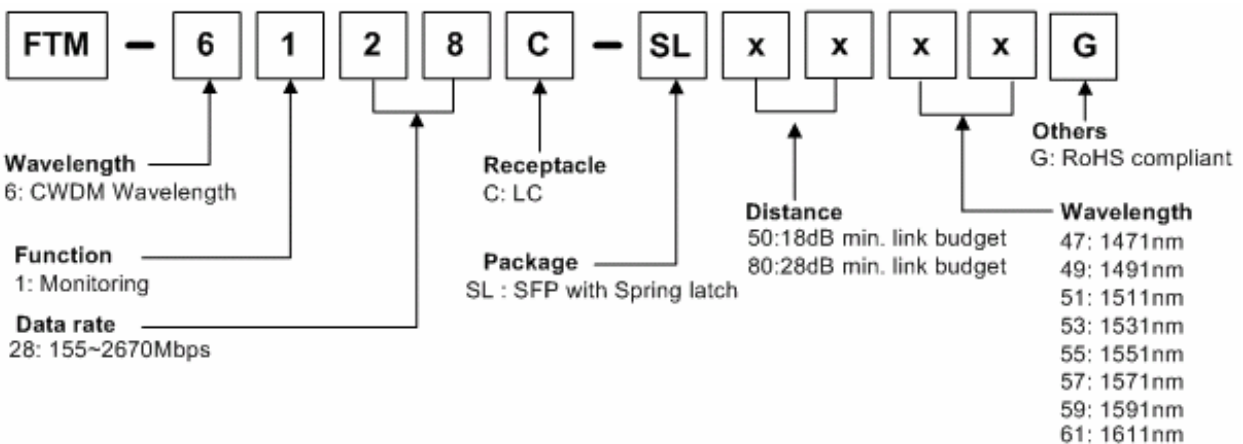


Figure 5, Mechanical Design Diagram of the SFP with Spring Latch

Ordering information



| Part No. | Product Description |
|-------------------|---|
| FTM-6128C-SL5047G | 1471nm (Gray Lever) 155M~2.67Gbps SFP with Spring latch, 18dB minimum link budget, with monitoring function |
| FTM-6128C-SL5049G | 1491nm (Violet Lever) 155M~2.67Gbps SFP with Spring latch, 18dB minimum link budget, with monitoring function |
| FTM-6128C-SL5051G | 1511nm (Blue Lever) 155M~2.67Gbps SFP with Spring latch, 18dB minimum link budget, with monitoring function |
| FTM-6128C-SL5053G | 1531nm (Green Lever) 155M~2.67Gbps SFP with Spring latch, 18dB minimum link budget, with monitoring function |
| FTM-6128C-SL5055G | 1551nm (Yellow Lever) 155M~2.67Gbps SFP with Spring latch, 18dB minimum link budget, with monitoring function |
| FTM-6128C-SL5057G | 1571nm (Orange Lever) 155M~2.67Gbps SFP with Spring latch, 18dB minimum link budget, with monitoring function |
| FTM-6128C-SL5059G | 1591nm (Red Lever) 155M~2.67Gbps SFP with Spring latch, 18dB minimum link budget, with monitoring function |
| FTM-6128C-SL5061G | 1611nm (Brown Lever) 155M~2.67Gbps SFP with Spring latch, 18dB minimum link budget, with monitoring function |
| FTM-6128C-SL8047G | 1471nm (Gray Lever) 155M~2.67Gbps SFP with Spring latch, 28dB minimum link budget, with monitoring function |
| FTM-6128C-SL8049G | 1491nm (Violet Lever) 155M~2.67Gbps SFP with Spring latch, 28dB minimum link budget, with monitoring function |
| FTM-6128C-SL8051G | 1511nm (Blue Lever) 155M~2.67Gbps SFP with Spring latch, 28dB minimum link budget, with monitoring function |
| FTM-6128C-SL8053G | 1531nm (Green Lever) 155M~2.67Gbps SFP with Spring latch, 28dB minimum link budget, with monitoring function |
| FTM-6128C-SL8055G | 1551nm (Yellow Lever) 155M~2.67Gbps SFP with Spring latch, 28dB minimum link budget, with monitoring function |
| FTM-6128C-SL8057G | 1571nm (Orange Lever) 155M~2.67Gbps SFP with Spring latch, 28dB minimum link budget, with monitoring function |
| FTM-6128C-SL8059G | 1591nm (Red Lever) 155M~2.67Gbps SFP with Spring latch, 28dB minimum link budget, with monitoring function |
| FTM-6128C-SL8061G | 1611nm (Brown Lever) 155M~2.67Gbps SFP with Spring latch, 28dB minimum link budget, with monitoring function |

Related Documents

For further information, please refer to the following documents:

- *Fiberxon Spring-latch SFP Installation Guide*
- *Fiberxon SFP Application Notes*
- *SFP Multi-Source Agreement (MSA)*

Obtaining Document

You can visit our website:

<http://www.fiberxon.com>

Or contact with Fiberxon, Inc. America Sales Office listed at the end of documentation to get the latest documents.

Revision History

| Revision | Initiate | Review | Approve | Subject | Release Date |
|----------|-------------|------------|-------------|-------------------|----------------|
| Rev. 1a | Univer.Yang | Bell.Huang | Walker.Weii | Initial datasheet | April 17, 2007 |
| Rev. 1b | Univer.Yang | Bell.Huang | Walker.Weii | Formal edition. | June 13, 2007 |
| | | | | | |

© Copyright Fiberxon Inc. 2007

All Rights Reserved.

All information contained in this document is subject to change without notice. The products described in this document are NOT intended for use in implantation or other life support applications where malfunction may result in injury or death to persons.

The information contained in this document does not affect or change Fiberxon product specifications or warranties. Nothing in this document shall operate as an express or implied license or indemnity under the intellectual property rights of Fiberxon or third parties. All information contained in this document was obtained in specific environments, and is presented as an illustration. The results obtained in other operating environment may vary.

THE INFORMATION CONTAINED IN THIS DOCUMENT IS PROVIDED ON AN "AS IS" BASIS. In no event will Fiberxon be liable for damages arising directly from any use of the information contained in this document.

Contact

U.S.A. Headquarter:

5201 Great America Parkway, Suite 340

Santa Clara, CA 95054

U. S. A.

Tel: 408-562-6288

Fax: 408-562-6289

Or visit our website: <http://www.fiberxon.com>