

CWDM SFP Transceiver**155Mb/s, SFP Pluggable, Duplex LC/PC Connector, +3.3V****1270~1610nm DFB-LD, Single-Mode****PCSFP-03-1XX12-12F**

DATASHEET

DESCRIPTION:

FTTX's CWDM Transceiver products provide optical networking equipment manufacturers with a timely and cost effective tool in supporting the unceasing demand for higher bandwidth equipment build-outs in the enterprise access and metropolitan area networks. There are 18 center wavelengths available from 1270nm to 1610nm. The 20nm channel spacing allows for un-cooled laser operation, a high yield manufacturing process, and lower cost Mux/Demux technology, thus providing a complete cost effective solution for various data and telecom applications.



FEATURES:

- 18 CWDM Wavelengths Available
- Build-in Isolator Optional
- Hot-Pluggable Duplex LC/PC Connector
- Single +3.3V Power Supply
- Operating Temperature from -40°C to +85°C
- Compliant with ITU-T G694.2
- Compliant with Telcordia(Bellcore) GR-468-CORE
- Designed to meet Laser Class1 Compliant with IEC60825-1

APPLICATIONS:

- SONET OC-3/SDH STM-1
- Fast Ethernet
- Other Optical Links

SPECIFICATIONS:

| Parameter | Symbol | Min. | Typical | Max. | Unit |
|--|-----------------|------|---------|-----------------|--------|
| Transmitter Differential Input Voltage | +/- TX_DAT | 650 | | 2000 | mV p-p |
| Supply Current | I _{CC} | | 200 | 250 | mA |
| Tx_Disable Input Voltage – Low | V _{IL} | 0 | | 0.8 | V |
| Tx_Disable Input Voltage – High | V _{IH} | 2.0 | | V _{CC} | V |
| Tx_Fault Output Voltage – Low | V _{OL} | 0 | | 0.8 | V |
| Tx_Fault Output Voltage – High | V _{OH} | 2.0 | | V _{CC} | V |
| Receiver Differential Output Voltage | +/- RX_DAT | 400 | | 2000 | mV p-p |
| Rx_LOS Output Voltage- Low | V _{OL} | 0 | | 0.8 | V |
| Rx_LOS Output Voltage- High | V _{OH} | 2.0 | | V _{CC} | V |

Transmitter:

| Parameter | Symbol | Min. | Typical | Max. | Unit |
|----------------------------------|--|-----------------------|-----------|-----------------------|------|
| Data Rate | B | - | 155 | - | Mb/s |
| Output Center Wavelength(0~70°C) | λ_c | $\lambda-5.5$ | λ | $\lambda+7.5$ | nm |
| Output Spectral Width | $\Delta\lambda$ | - | - | 1 | nm |
| Average Output Power | P _O | -5 | - | 0 | dBm |
| Extinction Ratio | E.R. | 9 | - | - | dB |
| Rise and Fall Time (20~80%) | T _r | - | | 0.15 | ns |
| Data Input Voltage-High | V _{IHS} | V _{CC} -1.16 | - | V _{CC} -0.89 | V |
| Data Input Voltage -Low | V _{ILS} | V _{CC} -1.82 | - | V _{CC} -1.48 | V |
| Supply Current | I _{CC} | - | - | 120 | mA |
| Output Optical Eye | Compliant with Eye Mask Defined in IEEE 802.3 standard | | | | |

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PCSFP-03-1XX12-12F

Receiver:

| Parameter | Symbol | Min. | Typical | Max. | Unit |
|--------------------------------------|--------------------------------|-----------------------|---------|-----------------------|------|
| Date Rate | B | - | 155 | - | Mb/s |
| Receive Sensitivity | S | - | - | -34 | dBm |
| Maximum Input Power | P _{max} | -3 | - | - | dBm |
| Operating Wavelength | λ_c | 1100 | - | 1620 | nm |
| Signal Detect Threshold-Assertion: | SD _{HIGH} | | | -35 | dBm |
| Signal Detect Threshold-Deassertion: | SD _{LOW} | -45 | | | dBm |
| Hysteresis | - | | 2.0 | | dBm |
| Supply Current | I _{CC} | - | - | 110 | mA |
| Rise and Fall Time (20~80%) | T _r /T _f | | | 0.15 | ns |
| Output High Voltage | V _{OH} | V _{CC} -1.03 | - | V _{CC} -0.89 | V |
| Output Low Voltage | V _{OL} | V _{CC} -1.82 | - | V _{CC} -1.63 | V |
| Alarm Output Interface | LV-TTL | | | | |

Electrical and Optical Characteristics (Condition: T_c= T_{op})

Absolute Maximum Ratings:(T_c=25°C)

| Parameter | Symbol | Min. | Max. | Units |
|-----------------------|-----------------|------|-----------------|-------|
| Storage Temperature | T _{st} | -40 | +85 | °C |
| Operating Temperature | T _{op} | -20 | +70 | °C |
| Supply Voltage | V _{CC} | 0 | V _{CC} | V |
| Output Current | I _o | 0 | 30 | mA |

Operating Environment:

| Parameter | Symbol | Min. | Max. | Units |
|-------------------------------|-----------------|------|------|-------|
| Supply Voltage | V _{CC} | +3.1 | +3.5 | V |
| Ambient Operating Temperature | T _A | -20 | 70 | °C |

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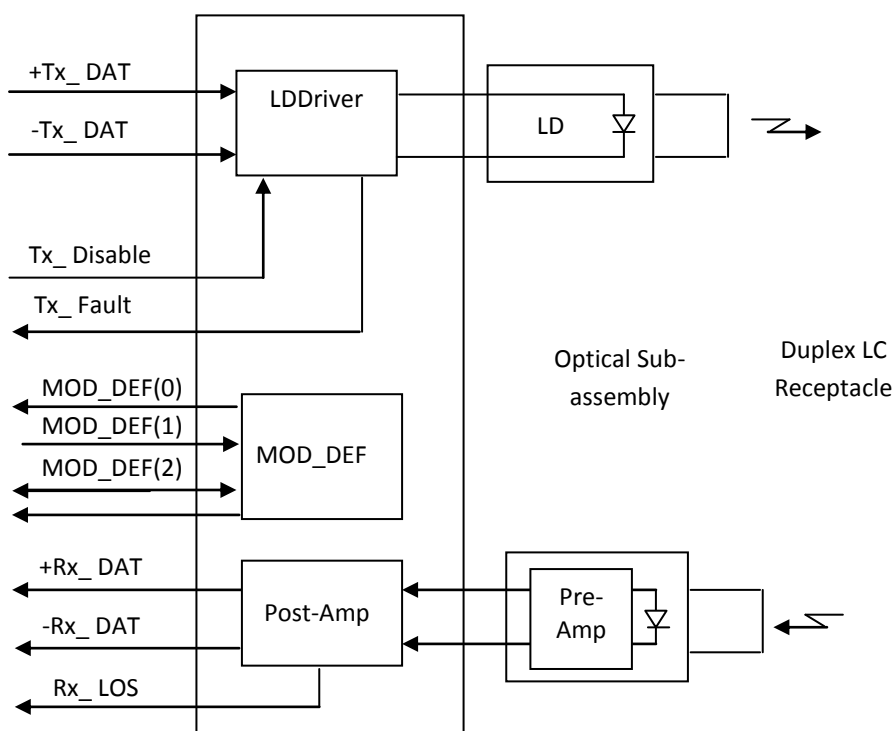
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Timing Characteristics:

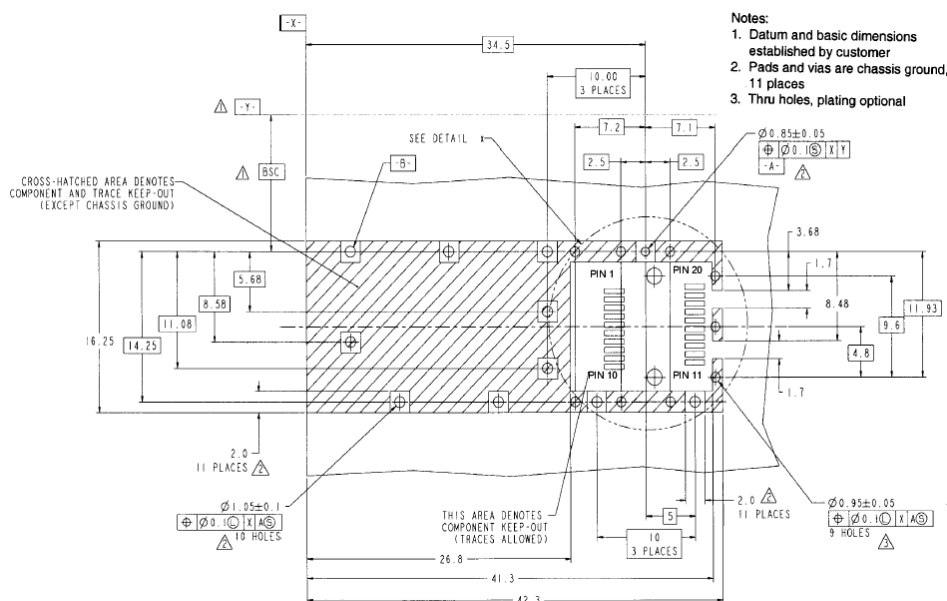
| Parameter | Symbol | Min. | Typical | Max. | Unit |
|--|-----------------|------|---------|------|------|
| TX_DISABLE Assert Time | t_{off} | | 3 | 10 | Usec |
| TX_DISABLE Negate Time | t_{on} | | 0.5 | 1 | msec |
| Time to Initialize Include Reset of TX_FAULT | t_{int} | | 30 | 300 | msec |
| TX_FAULT from Fault to Assertion | t_{fault} | | 20 | 100 | Usec |
| TX_DISBEL Time to Start Reset | t_{reset} | 10 | | | Usec |
| Receiver Loss of Signal Assert Time (off to On) | T_{A,RX_LOS} | | | 100 | Usec |
| Receiver Loss of Signal Assert Time (On to Off) | T_{d,RX_LOS} | | | 100 | Usec |

Block Diagram of Transceiver:



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SFP Host Board Mechanical Layout:



Pin Description:

| Pin | Symbol | Name/Description | Ref. |
|-----|--------------------|--|------|
| 1 | V _{IET} | Transmitter Ground (Common with Receiver Ground) | 1 |
| 2 | T _{FAULT} | Transmitter Fault. Low normal operation, High fault indication | 2 |
| 3 | T _{DIS} | Transmitter Disable. Laser output disabled on high or open. | 3 |
| 4 | MOD DEF(2) | Module Definition 2. Data line for Serial ID. | 4 |
| 5 | MOD DEF(1) | Module Definition 1. Clock line for Serial ID. | 4 |
| 6 | MOD DEF(0) | Module Definition 0. Grounded within the module. | 4 |
| 7 | Rate Select | No connection required | |
| 8 | LOS | Loss of Signal indication. Logic 0 indicates normal operation. | 5 |
| 9 | V _{IER} | Receiver Ground (Common with Transmitter Ground) | 1 |
| 10 | V _{IER} | Receiver Ground (Common with Transmitter Ground) | 1 |
| 11 | V _{IER} | Receiver Ground (Common with Transmitter Ground) | 1 |
| 12 | RD- | Receiver Inverted DATA out. AC Coupled | |
| 13 | RD+ | Receiver Non-inverted DATA out. AC Coupled | |
| 14 | V _{IER} | Receiver Ground (Common with Transmitter Ground) | 1 |
| 15 | V _{CCR} | Receiver Power Supply | |
| 16 | V _{CCT} | Transmitter Power Supply | |
| 17 | V _{IET} | Transmitter Ground (Common with Receiver Ground) | 1 |
| 18 | TD+ | Transmitter Non-Inverted DATA in. AC Coupled. | |
| 19 | TD- | Transmitter Inverted DATA in. AC Coupled. | |
| 20 | V _{IET} | Transmitter Ground (Common with Receiver Ground) | 1 |

Notes:

1. Circuit ground is internally isolated from chassis ground.
2. TX Fault is an open collector/drain output, which should be pulled up with a 4.7K–10K Ω resistor on the host board. Pull up voltage between 2.0V and VcCT, R+0.3V. When high, output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.
3. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.

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4. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 3.6V.
MOD_DEF(0) pulls line low to indicate module is plugged in.
5. LOS is open collector output. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

Serial ID Memory Contents:

| Data Address | Length (Byte) | Name of Length | Description and Contents |
|----------------------------------|---------------|----------------|--|
| Base ID Fields | | | |
| 0 | 1 | Identifier | Type of Serial transceiver (03h=SFP) |
| 1 | 1 | Reserved | Extended identifier of type serial transceiver (04h) |
| 2 | 1 | Connector | Code of optical connector type (07=LC) |
| 3-10 | 8 | Transceiver | Gigabit Ethernet 1000Base-ZX & Fiber Channel |
| 11 | 1 | Encoding | 8B10B (01h) |
| 12 | 1 | BR,Nominal | Nominal baud rate, unit of 100Mbps |
| 13-14 | 2 | Reserved | (0000h) |
| 15 | 1 | Length(9um) | Link length supported for 9/125um fiber, units of 100m |
| 16 | 1 | Length(50um) | Link length supported for 50/125um fiber, units of 10m |
| 17 | 1 | Length(62.5um) | Link length supported for 62.5/125um fiber, units of 10m |
| 18 | 1 | Length(Copper) | Link length supported for copper, units of meters |
| 19 | 1 | Reserved | |
| 20-35 | 16 | Vendor Name | SFP vendor name |
| 36 | 1 | Reserved | |
| 37-39 | 3 | Vendor OUI | SFP transceiver vendor OUI ID |
| 40-55 | 16 | Vendor PN | Part Number: "OPXXXXXX" (ASCII) |
| 56-59 | 4 | Vendor rev | Revision level for part number |
| 60-61 | 2 | Wavelength | Laser wavelength |
| 62 | 1 | Reserved | |
| 63 | 1 | CCID | Least significant byte of sum of data in address 0-62 |
| Extended ID Fields | | | |
| 64-65 | 2 | Option | Indicates which optical SFP signals are implemented (001Ah = LOS, TX_FAULT, TX_DISABLE all supported) |
| 66 | 1 | BR, max | Upper bit rate margin, units of % |
| 67 | 1 | BR, min | Lower bit rate margin, units of % |
| 68-83 | 16 | Vendor SN | Serial number (ASCII) |
| 84-91 | 8 | Date code | Manufacturing date code |
| 92-94 | 3 | Reserved | |
| 95 | 1 | CCEX | Check code for the extended ID Fields (addresses 64 to 94) |
| Vendor Specific ID Fields | | | |
| 96-127 | 32 | Readable | Specific date, read only |

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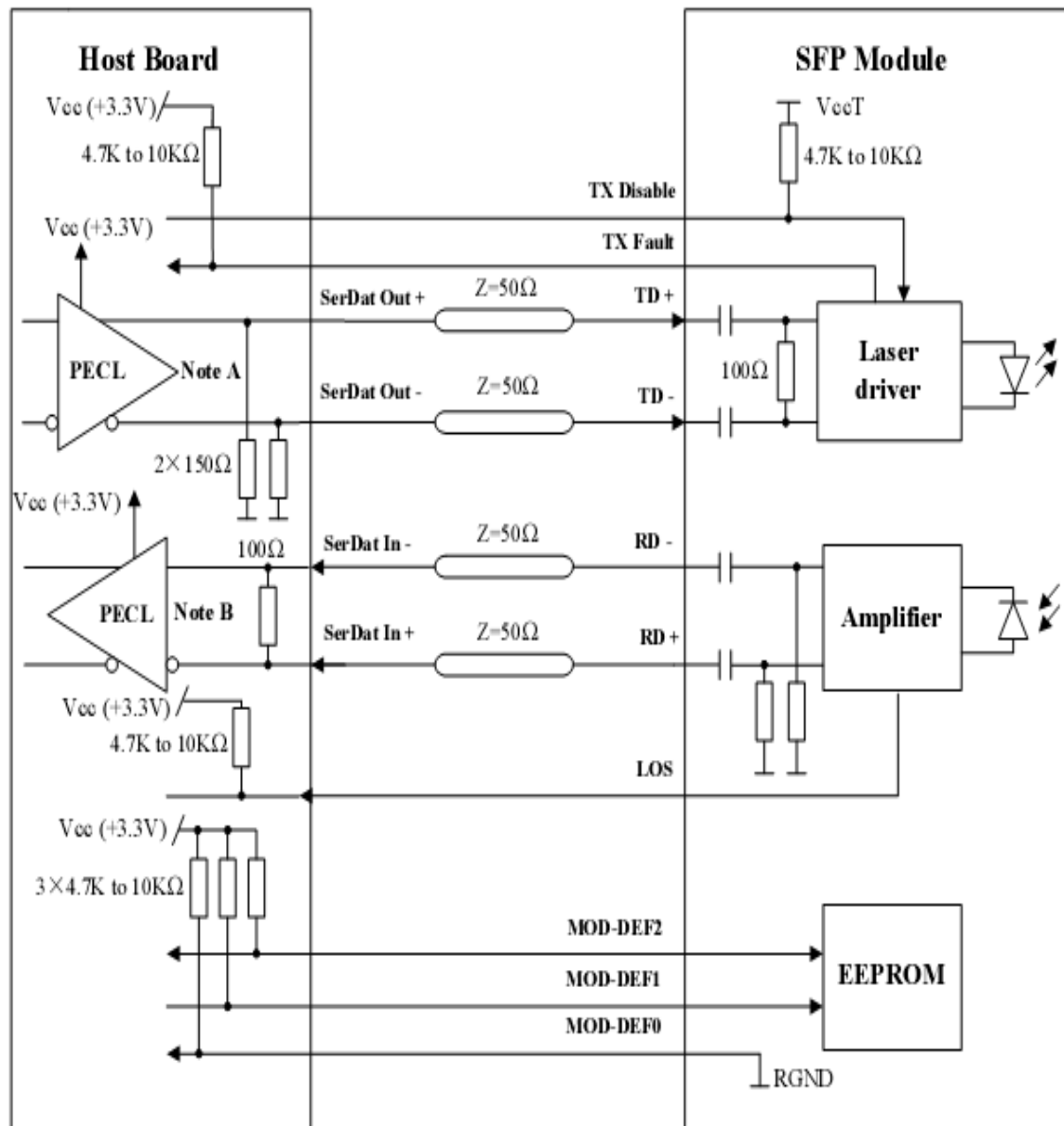
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Recommended Circuit:



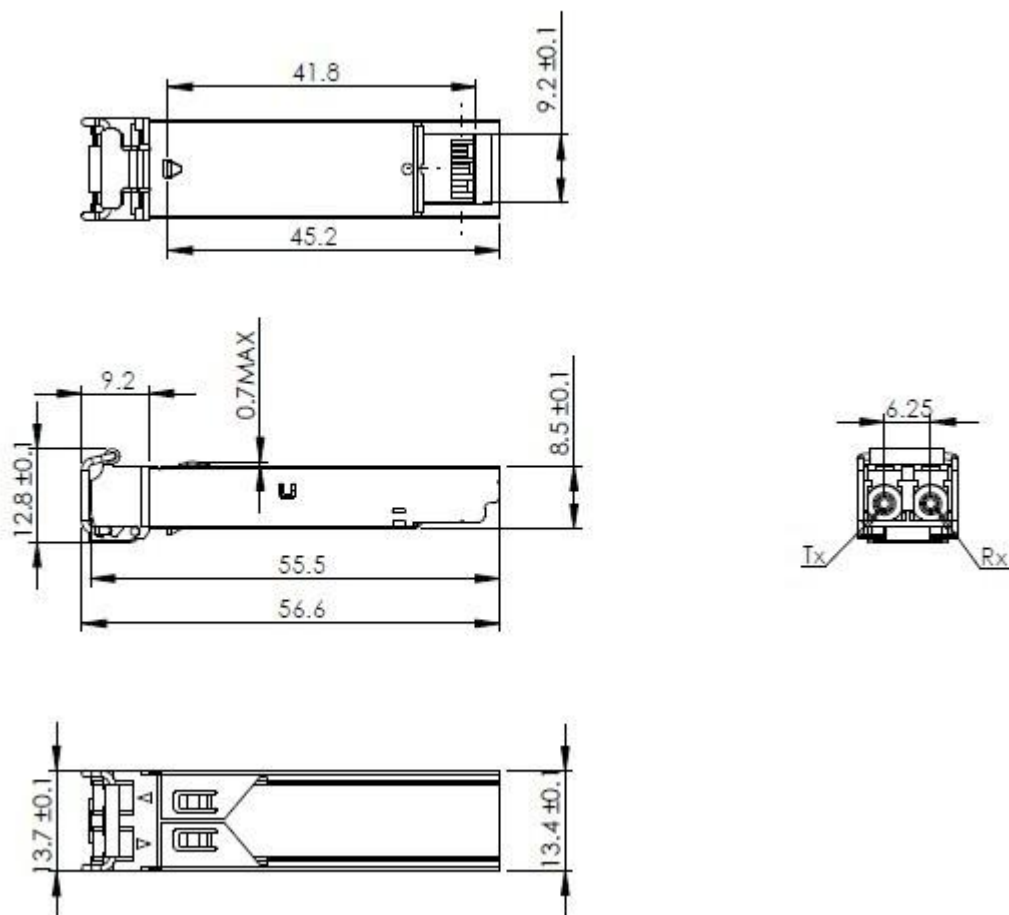
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Mechanical Dimensions:



Note: In the Part No. of **PCSFP-03-1xx12-12F**, XX stands for wavelength, such as:
 27: for 1270nm, 29: for 1290nm, 31: for 1310nm, 33: for 1330nm, 35: for 1350nm,
 37: for 1270nm, 39: for 1290nm, 41: for 1410nm, 43: for 1430nm, 45: for 1450nm,
 47: for 1470nm, 49: for 1490nm, 51: for 1510nm, 53: for 1530nm, 55: for 1550nm,
 57: for 1570nm, 59: for 1590nm, 61: for 1610nm.