# SFP-XP-DXX96-80D-PCT

## 10 Gb/s Single-Mode DWDM SFP+ Transceiver


### Description

PCT's SFP-XP-DXX96-80D-PCT transceivers include an APD diode and temperature stabilized DFB-EML transmitter. Digital diagnostic functions are available via an I2C.

This module is designed for single mode fiber and operates at a nominal wavelength of 100 GHz ITU Grid, C Band DWDM wavelength.

### Hardware Features

- Duplex LC connector
- Compliant with SFP+ MSA
- Compliant to 802.3ae 10GBASE-ZR
- Compliant to SFP+ SFF-8431 and SFF-8432
- Hot-pluggable SFP footprint
- Built-in digital diagnostic functions
- Maximum link length of 80 km
- Single power supply 3.3 V
- RoHS6 compliant
- Class 1 laser product complies with EN 60825-1
- Case temperature range: -5 to 70°
- Power dissipation < 1.5 W

### Applications

- 10GBASE-ZR / ZW
- 80 km 10G fiber channel
- 10G Ethernet with FEC

### Standards

- Conforms to SFP+ SFF-8431 and SFF-8432
- Compliant with 802.3ae 10GBase-ZR
- RoHS compliant and lead free

### Ordering Information

**SFP+ Transceiver, Single Mode**

| | |
|---|---|
| SFP-XP-DXX96-80D-PCT | 10 Gb/s Single Mode DWDM SFP+ Transceiver |

RoHS

# SFP-XP-DXX96-80D-PCT

## 10 Gb/s Single-Mode DWDM SFP+ Transceiver

## Specifications

| Parameters | Symbol | Unit | SFP-XP-DXX96-80D-PCT | | |
|---|---|---|---|---|---|
| **Absolute Maximum Ratings** | | | Min | Typ | Max |
| Maximum Supply Voltage | Vcc | V | -0.5 | - - | 3.6 |
| Storage Temperature | Ts | °C | -40 | - - | 85 |
| Case Operating Temperature | Tcase | °C | -5 | - - | 70 |
| **Electrical Characteristics** | | | | | |
| Supply Voltage | Vcc | V | 3.14 | 3.3 | 3.46 |
| Supply Current | Icc | mA | - - | 300 | 450 |
| ***Transmitter*** | | | | | |
| Input Differential Impedance [1] | Ohm | Ohm | - - | 100 | - - |
| Differential Data Input Swing | Vin,pp | mV | 120 | - - | 820 |
| Transmit Disable Voltage | VD | V | Vcc-1.3 | - - | Vcc |
| Transmit Enable Voltage [2] | VEN | V | Vee | - - | Vee+0.8 |
| TX_FAULT Voltage-High | - - | V | Vcc-1.3 | - - | Vcc |
| TX_FAULT Voltage-Low | - - | V | Vee | - - | Vee+0.8 |
| Transmit Disable Assert Time | - - | µs | - - | - - | 10 |
| ***Receiver*** | | | | | |
| Differential Data Output Swing [3] | Vout,pp | mV | 350 | - - | 850 |
| Data Output Rise Time [4] | tr | ps | 30 | - - | - - |
| Data Output Fall Time [4] | tf | ps | 30 | - - | - - |
| Loss Of Signal Assert [5] | - - | V | Vee | - - | Vee+0.8 |
| Loss Of Signal De-assert [5] | - - | V | Vcc-1.3 | - - | VccHOST |
| **Optical Characteristics** | | | | | |
| ***Transmitter*** | | | | | |
| Average Optical Power [1] | Pavg | dBm | 0 | - - | +5 |
| Optical Wavelength | λc | nm | λc-0.1 | - - | λc+0.1 |
| Center Wavelength Spacing [2] | - - | GHz | - - | 100 | - - |
| Optical Extinction Ratio | ER | dB | 6.0 | - - | - - |
| Transmitter and Dispersion Penalty | TDP | dB | - - | - - | 3.0 |
| Side Mode Supression Ratio | SMSR | dB | 30 | - - | - - |
| Optical Rise / Fall Time | tr / tf | ns | - - | 0.1 | 0.26 |
| Average Launch Power | Poff | dBm | - - | - - | -40 |
| RIN | RIN | dB/Hz | - - | - - | -128 |
| ***Receiver*** | | | | | |
| Rx Sensitivity [3] | RSENS | dBm | - - | - - | -23 |
| Input Saturation Power (Overload) | Psat | dBm | -7 | - - | - - |
| Wavelength Range | λc | nm | 1480 | - - | 1580 |
| Loss Of Signal Assert | LOSA | dBm | -32 | - - | - - |
| Loss Of Signal De-assert | LOSD | dBm | - - | - - | -26 |
| LOS Hysteresis | - - | dB | 0.5 | - - | - - |

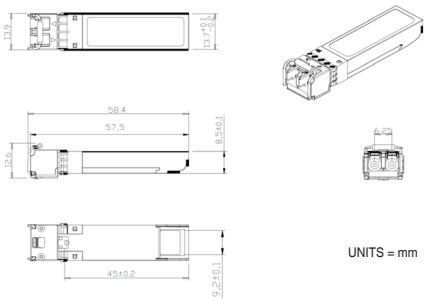
Electrical Characteristics Notes
1. Connected directly to TX data input pins. AC coupled thereafter.
2. Or open circuit.
3. Into 100 Ohms differential termination.
4. These are unfiltered 20 to 80 % values.
5. Loss Of Signal is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

Optical Characteristics Notes
1. Output power is power coupled into a 9/125 mm single-mode fiber.
2. Corresponds to approximately 0.8 nm.
3. With worst-case extinction ratio. Measured with a PRBS 2 -1 test pattern, @10.325 Gb/s, BER<10.

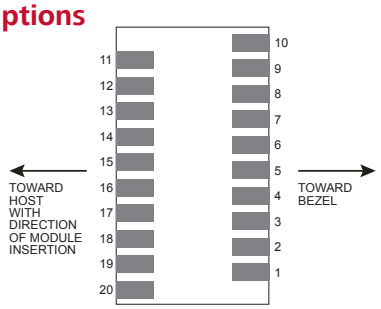
## Regulatory Compliance

| Feature | Reference | Performance |
|---|---|---|
| Electrostatic Discharge (ESD) | IEC/EN 61000-4-2 | Compatible with standards |
| Electromagnetic Interference (EMI) | FCC Part 15 Class B EN 55022 Class B (CISPR 22A) | Compatible with standards |
| Laser Eye Safety | FDA 21CFR 1040.10, 1040.11 IEC/EN 60825-1, 2 | Class 1 laser product |
| Component Recognition | IEC/EN 60950, UL | Compatible with standards |
| RoHS | 2002/95/EC | Compatible with standards |
| EMC | EN61000-3 | Compatible with standards |

## Diagrams




## Pin Descriptions




| Pin | Symbol | Name / Description |
|---|---|---|
| 1 | $V_{EET}$ | Transmitter Ground (Common with Receiver Ground) [1] |
| 2 | $T_{FAULT}$ | Transmitter Fault [2] |
| 3 | $T_{DIS}$ | Transmitter Disable. Laser output disabled on high or open. [3] |
| 4 | SDA | 2-wire Serial Interface Data Line [4] |
| 5 | SCL | 2-wire Serial Interface Clock Line [4] |
| 6 | MOD_ABS | Module Absent. Grounded within the module. [4] |
| 7 | RS0 | Rate Select 0 [5] |
| 8 | LOS | Loss of Signal indication. Logic 0 indicates normal operation. [6] |
| 9 | RS1 | No connection required [1] |
| 10 | $V_{EER}$ | Receiver Ground (Common with Transmitter Ground) [1] |
| 11 | $V_{EER}$ | 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 | $V_{EER}$ | Receiver Ground (Common with Transmitter Ground) [1] |
| 15 | $V_{CCR}$ | Receiver Power Supply |
| 16 | $V_{CCT}$ | Transmitter Power Supply |
| 17 | $V_{EET}$ | 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 | $V_{EET}$ | Transmitter Ground (Common with Receiver Ground) [1] |

Notes:
1. Circuit ground is internally isolated from chassis ground.
2. TFAULT is an open collector / drain output, which should be pulled up with a 4.7 to 10 k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0 V to Vcc + 0.3 V. A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8 V.
3. Laser output disabled on T > 2.0 V or open, enabled on T < 0.8 V.
4. Should be pulled up with 4.7 to 10 k Ohms host board to a voltage between 2.0 V and 3.6 V. MOD_ABS pulls line low to indicate module is plugged in.
5. Internally pulled down per SFF-8431 Rev 4.1.
6. LOS is open collector output. It should be pulled up with 4.7 to 10 k Ohms on host board to a voltage between 2.0 V and 3.6 V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.


**Call +1.800.306.8948 for more information**
2260 W Broadway Rd | Mesa AZ 85202-1898 | USA | pctinternational.com

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