

# SFP-DXX24-80D-PCT

## 2.5 Gb/s Single-Mode DWDM SFP Transceiver



### Description

PCT's SFP-DXX24-80D-PCT Small Form Factor Pluggable (SFP) transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA) and SFF-8472. The transceiver consists of five sections:

- LD driver
- Limiting amplifier
- Digital diagnostic monitor
- DFB laser
- APD

The module data links up to 80 km in 9/125  $\mu\text{m}$  single mode fiber. It offers a simple and convenient way to interface PCBs to single mode fiber optic cables in Dense Wavelength Division Multiplexing (DWDM) applications. It is a high performance, cost effective module for serial optical data communication applications.

The optical output can be disabled by a TTL logic high-level input of Tx Disable, and the system also can disable the module via I2C. Tx Fault is provided to indicate that degradation of the laser. Loss Of Signal (LOS) output is provided to indicate the loss of an input optical signal of receiver or the link status with partner. The system can also get the LOS (or Link) / Disable / Fault information via I2C register access.

### Hardware Features

- Transceiver unit with independent DWDM DFB laser diode transmitter APD photodiode receiver
- Compliant with DWDM SFP MSA

- SFF-8472 with duplex LC receptacle
- Hot-pluggable
- Metal enclosure for lower EMI
- 3.3 V Single power supply
- 100 GHz ITU Grid, C Band
- Wavelength controlled within  $\pm 0.1$  nm over life and temperature
- Digital diagnostic monitoring
- 80 km with 9/125  $\mu\text{m}$  single mode fiber (SMF) of maximum interconnect distances
- Case operating temperature 0° to 70 °C

### Applications

- C Band DWDM networks
- SONET / SDH networks
- Fiber channel
- Gigabit Ethernet

### Standards

- Conforms to SFF-8472 SFF-8431 and SFF-8432
- Compliant with 802.3ae 10GBase-LR
- RoHS compliant and lead free

### Ordering Information

#### SFP Transceiver, Single Mode

SFP-DXX24-80D-PCT	2.5 Gb/s Single Mode DWDM SFP Transceiver
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### Specifications

Parameters	Symbol	Unit	SFP-DXX24-80D-PCT		
			Min	Typ	Max
<b>Absolute Maximum Ratings</b>					
Storage Temperature	T <sub>s</sub>	°C	-40	--	85
Storage Ambient Humidity	HA	%	5	--	95
Power Supply Voltage	V <sub>cc</sub>	V	-0.5	--	4
Signal Input Voltage	--	V	-0.3	--	V <sub>cc</sub> +0.3
Receiver Damage Threshold	--	dBm	+5	--	--
<b>Recommended Operating Conditions</b>					
Case Operating Temperature	T <sub>case</sub>	°C	0	--	70
Power Supply Voltage	V <sub>cc</sub>	V	3.13	3.3	3.47
Power Supply Current	I <sub>cc</sub>	mA	--	--	500
Power Supply Noise Rejection	--	mVp-p	--	--	100
Data Rate	--	Mbps	--	2500/2500	2700
Transmission Distance	--	km	--	--	40
Coupled Fiber	Single mode fiber				
<b>Transmitter</b>					
Center Wavelength Spacing		GHz	--	100	--
Center Wavelength <sup>1</sup>	λ	nm	X-100	X	X+100
Average Output Power	P <sub>OUT</sub>	dBm	0	--	4
Extinction Ratio	ER	dB	8.2	--	--
Side Mode Suppression Ratio	SMSR	dB	30	--	--
Spectrum Bandwidth (-20 dB)	Ohm	nm	--	--	0.3
Transmitter OFF Output Power	P <sub>OFF</sub>	dBm	--	--	-45
Differential Line Input Impedance	R <sub>IN</sub>	Ohm	90	100	110
Output Eye Mask <sup>2</sup>	Compliant with ITU recommendation G.957				
<b>Receiver</b>					
Input Optical Wavelength <sup>1</sup>	λ <sub>IN</sub>	nm	1270	--	1610
Receiver Sensitivity <sup>2</sup>	P <sub>IN</sub>	dBm	--	--	-28
Input Saturation Power (Overload)	P <sub>SAT</sub>	dBm	-10	--	--
Loss Of Signal Assert	PA	dBm	-40	--	--
Loss Of Signal De-assert <sup>3</sup>	P <sub>D</sub>	dBm	--	--	-31
LOS Hysteresis	P <sub>A</sub> -P <sub>D</sub>	dB	0.5	2	6
<b>Electrical Interface Characteristics</b>					
<b>Transmitter</b>					
Total Supply Current <sup>1</sup>	I <sub>cc</sub>	mA	--	--	A
Transmitter Disable Input-High	V <sub>DISH</sub>	V	2	--	V <sub>cc</sub> +0.3
Transmitter Disable Input-Low	V <sub>DISL</sub>	V	0	--	0.8
Transmitter Fault Input-High	V <sub>TxFH</sub>	V	2	--	V <sub>cc</sub> +0.3
Transmitter Fault Input-Low	V <sub>TxFL</sub>	V	0	--	0.8
<b>Receiver</b>					
Total Supply Current <sup>1</sup>	I <sub>cc</sub>	mA	--	--	B
LOSS Output Voltage-High <sup>2</sup>	V <sub>LOSH</sub>	V	2	--	V <sub>cc</sub> +0.3
LOSS Output Voltage-Low <sup>2</sup>	V <sub>LOSL</sub>	V	0	--	0.8

#### Transmitter Notes

1. X = specified ITU center wavelength.

2. Transmitter eye mask definition

#### Receiver Notes

1. APD

2. Measured with Light source 1550 nm, ER=9 dB, BER =<10<sup>-12</sup> @ PRBS=2<sup>23</sup>-1 NRZ

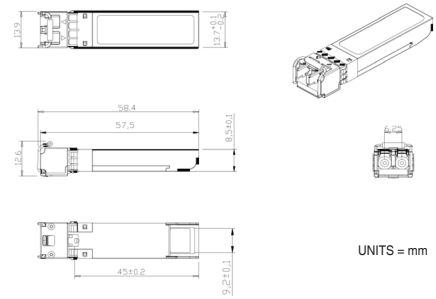
3. When LOS de-asserted, the RX data + / - output is signal output.

#### Electrical Notes:

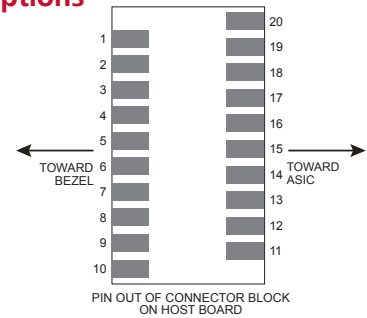
1. A (TX) + B (RX) = 300 mA (Not include termination circuit)

2. LVTTL

### Diagrams



### Pin Descriptions



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

#### Notes:

1. Circuit ground is internally isolated from chassis ground.

2. Laser output disabled on T<sub>DIS</sub> > 2.0 V or open, enabled on T<sub>DIS</sub> < 0.8 V.

3. Should be pulled up with 4.7 - 10 k Ohms on host board to a voltage between 2.0 V and 3.6 V. MOD\_DEF (0) pulls line low to indicate module is plugged in.

4. This is an optional input used to control the receiver bandwidth for compatibility with multiple data rates (most likely fiber channel 1x and 2x rates). If implemented, the input will be internally pulled down with > 30 k Ohms resistor. The input states are:

- Low (0 to 0.8 V): Reduced Bandwidth
- (>0.8, < 2.0 V): Undefined
- High (2.0 to 3.465 V): Full Bandwidth
- Open: Reduced Bandwidth

5. LOS is open collector output should be pulled up with 4.7 - 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.

### 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



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Specifications subject to change.

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