

# SFP Optical Transceiver Module



## Features & Benefits

- 4 channels full-duplex transceiver modules
- Transmission data rate up to 26Gbps per channel
- 4 x 26Gb/s DFB-based LAN-WDM Cooling transmitter
- 4 channels PIN ROSA
- Internal CDR circuits on both receiver and transmitter channels
- Low power consumption <3.5W
- Hot Pluggable QSFP form factor
- Up to reach 10km for G.652 SMF
- Duplex LC receptacles
- Built-in digital diagnostic functions
- Operating case temperature 0 °C to 70 °C (32 °F to 158 °F)
- 3.3V power supply voltage
- RoHS 6 compliant (lead free)



## Overview

PPC's Transceiver modules are designed for optical communication applications compliant to the IEEE P802.3ba standard. The module converts input channels up to 25Gb/s electrical data to LAN WDM optical signals, then multiplexes them into a single channel for optical transmission. Reversely on the receiver side, the module de-multiplexes optical input into LAN WDM optical signals, then converts them to output channels of electrical data.

## Application

- IEEE 802.3ba
- IEEE802.3 z
- Switch to Switch Interface
- Gigabit Ethernet
- Switched Backplane Applications
- Router/Server Interface
- Other Optical Links

## Technical Data

### Absolute Maximum Ratings

Specification	Symbol	Unit	Min	Max
Supply Voltage	Vcc	V	-0.3	3.6
Input Voltage	Vin	V	-0.3	Vcc+0.3
Storage Temperature	Tst	°C (°F)	-20 (-4)	85 (185)
Case Operating Temperature	Top	°C (°F)	0 (32)	70 (158)
Humidity (non-condensing)	Rh	%	5	85
Damage Threshold, each Lane	TH	dBm	5.5	

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## Technical Data

### Environmental Data

Specification	Symbol	Unit	Min	Typical	Max
Supply Voltage	Vcc	V	3.13	3.3	3.47
Operating Case temperature	Tca	°C (°F)	0 (32)		70 (158)
Data Rate Per Lane	fd	Gbps		25.78125	
Humidity	Rh	%	5		85
Power Dissipation	P	W			3.5
Link Distance with G.652	D	km	0.002		10

### Electrical Specifications

Specification	Symbol		Min	Typical	Max
Power Consumption	P	W			3.5
Supply Current	Icc	A			1.06
Transceiver Power-on Initialization Time		ms			2000
Transmitter(each Lane)					
Single-ended Input Voltage Tolerance		V		-0.3	4.0
AC Common Mode Input Voltage Tolerance		mV	15		
Differential Input Voltage		mVpp	50		
Differential Input Voltage Swing	Vin	mVpp			900
Differential Input Impedance	Zin	Ohm	90	100	110
Receiver(each Lane)					
Single-ended Output Voltage		V	-0.3		4.0
AC Common Mode Output Voltage		mV			7.5
Differential Output Voltage Swing	Vout	mVpp	300		850
Differential Output Impedance	Zout	Ohm	90	100	110

#### Note:

Power-on Initialization Time is the time from when the power supply voltages reach and remain above the minimum recommended operating supply voltages to the time when the module is fully functional.

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### Optical Specifications

Specification	Symbol	Min	Typical	Max	Unit
Lane Wavelength		1270		1550	nm
<b>Transmitter</b>					
SMSR	SMSR	30			dB
Total Average Launch	PT			10.5	dBm
Average Launch Power, each Lane	PAVG	-4.3		4.5	dBm
OMA, each Lane	POMA	-1.3		4.5	dBm
Difference in Launch Power	Ptx,diff			5	dB
Launch Power in OMA		-2.3			dBm
TDP, each Lane	TDP			2.2	dB
Extinction Ratio	ER	4			dB
RIN20OMA	RIN			-130	dB/H
Optical Return Loss	TOL			20	dB
Transmitter Reflectance	RT			-12	dB
Eye Mask coordinates: X1, X2, X3, Y1, Y2, Y3		{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}			
Average Launch Power OFF	Poff			-30	dBm
<b>Receiver</b>					
Damage Threshold, each Lane	THd	5.5			dBm
Total Average Receive				10.5	dBm
Average Receive Power, each Lane		-10.6		4.5	dBm
Receive Power (OMA), each Lane				4.5	dBm
Receiver Sensitivity (OMA), each Lane	SEN			-8.6	dBm
Stressed Receiver Sensitivity (OMA), each Lane				-6.8	dBm
Difference in Receive Power between any Two Lanes (OMA)	Prx,diff			5.5	dB
LOS Assert	LOSA	-35.0		-18.0	dBm
LOS Deassert	LOSD	-21.0		-15.0	dBm
LOS Hysteresis	LOSH	0.5		6.0	dB
Receiver Electrical 3 dB upper Cutoff Frequency, each Lane	Fc			31	GHz

### Conditions of Stress Receiver Sensitivity Test

Specification	Symbol	Min	Typical	Max	Unit
Vertical Eye Closure Penalty, each Lane			1.8		dB
Stressed Eye J2 Jitter, each Lane			0.3		UI
Stressed Eye J9 Jitter, each Lane			0.47		UI

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### Note:

- Even if the TDP < 1 dB, the OMA min must exceed the minimum value specified here.
- The receiver shall be able to tolerate, without damage, continuous exposure to a modulated optical input signal having this power level on one lane. The receiver does not have to operate correctly at this input power.
- Measured with conformance test signal at receiver input for BER = 1x10<sup>-12</sup>.
- Vertical eye closure penalty and stressed eye jitter are test conditions for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

### ESD

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all other electrical input pins, tested per MIL-STD-883, Method 3015.4 /JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

### Laser Safety

This is a Class 1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

## Ordering Information

Part Number	Description
SFP155M20SC1315	155Mbps SFP SC 1310/1550nm 20km DDM
SFP155M20SC1513	155Mbps SFP SC 1550/1310nm 20km DDM
SFP1G20BDLC1315	1.25G SFP LC T1310nm/R1550nm 20KM
SFP1G20BDLC1513	1.25G SFP LC T1550nm/R1310nm 20KM
SFP1G40BDLC1315	1.25G SFP LC T1310/R1550nm 40KM
SFP1G40BDLC1513	1.25G SFP LC T1550/R1310nm 40KM
SFP1G40BDLC1314	1.25G SFP LC 1310/1490nm 40KM DDM
SFP1G40BDLC1413	1.25G SFP LC 1490/1310nm 40KM DDM
SFP1G80BDLC1415	1.25G SFP LC T1490/R1550nm 80KM DDM
SFP1G80BDLC1514	1.25G SFP LC T1550/R1490nm 80KM DDM
SFP1G120DLC1415	1.25G SFP LC T1490/R1550 120KM DDM
SFP1G120DLC1514	1.25G SFP LC T1550/R1490 120KM DDM
SFP10G20DFLC1310	10G SFP+ DSM LR 1310nm 20KM
SFP10G20BDLC7030	10G SFP+ T1270/R1330nm 20KM
SFP10G40BDLC3070	10G SFP+ T1330/R1270nm 40KM
SFP10G80BDLC1415	10G SFP+ T1490/R1550nm 80KM
SFP10G80BDLC1514	10G SFP+ T1550/R1490nm 80KM
SFP10G20BDLC1213	10G WDM T1270nm/R1330nm 20KM
SFP10G40BDLC1213	10G WDM T1270nm/R1330nm 40KM
SFP10G60BDLC1213	10G WDM T1270nm/R1330nm 60KM
SFP10G20BDLC1312	10G WDM T1330nm/R1270nm 20KM
SFP10G40BDLC1312	10G WDM T1330nm/R1270nm 40KM
SFP10G60BDLC1312	10G WDM T1330nm/R1270nm 60KM
SFP10G80BDLC7030	10G SFP+ BIDI T1270/R1330nm 80km
SFP10G80BDLC3070	10G SFP+ BIDI T1330/R1270nm 80km

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