

**1.25 Gb/s, 40 - 100 km
CWDM 1270 nm – 1450 nm
SFP Dual LC Package**

Description

OptoC's CWDM transceivers are designed with high performance DFB laser and cover the wavelength spectrum from 1270 nm to 1450 nm, with industry standard 20 nm spacing. Dual LC connectors are used as standard interface and the package is compliant with Small Form Pluggable (SFP) specifications.

The module supports serial ID functionality and Digital Diagnostic Monitoring (DDM) interface through the 2-wire serial bus. It is compliant with SFP Multi-Source Agreement (MSA). This product can be used at 1.0625 Gb/s for Fiber Channel or 1.25 Gb/s for Gigabit Ethernet applications. They offer 40 - 100 km of transmission distance with single mode fibers. The products are RoHS compliant.

Key Features

- 1270 - 1450 nm single mode, 1.0625/1.25 Gb/s
- 40 – 100 km with 20 - 30 dB power budget
- Digital diagnostic and real time monitoring
- Duplex LC connector optical interface
- Z-axis hot pluggable
- SFF-8472 MSA Compliant with DDM function
- AC coupling LVPECL differential I/O logics
- TTL Signal detect to monitor optical signals
- Single 3.3 V power supply
- RoHS compliant

Applications

- ✓ 1X Fiber Channel and Gigabit Ethernet
- ✓ High speed I/O for file server
- ✓ Video over fiber links
- ✓ Media converter
- ✓ Data Communication for SAN and LAN
- ✓ Central offices routers and switches
- ✓ Mass storage systems interconnect
- ✓ Computer cluster cross-connect



Lead-Free

SFP-1250CLX-ATXXK-YY
(XX = 40, 60, 80, 100)



Ordering Information

Part Number: SFP-1250CLX-ATXXK-YY

Description:

CWDM 1270 - 1450 nm 1.0625/1.25 Gb/s SFP Fiber Optics Transceiver, XX km reach, 1YY0 nm wavelength, 0 - 70°C.

* YY specifies the wavelength described below. For example, SFP-1250CLX-ATXXK-27 is the 1270 nm module.

* Add "-D" in the Part Number for DDM, i.e., SFP-1250CLX-AT60K-D.

YY	Wavelength	YY	Wavelength
27	1270 nm	37	1370 nm
29	1290 nm	39	1390 nm
31	1310 nm	41	1410 nm
33	1330 nm	43	1430 nm
35	1350 nm	45	1450 nm

Operating Conditions

Parameter	Min.	Typical	Max.	Units
Operate Temperature	0	25	70	°C
Data Rate	---	1.25	1.3	Gb/s
Supply Voltage	3.1	3.3	3.5	V

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	T_{st}	-40	85	°C
Supply Voltage	V_{CC}	-0.5	6.0	V
Input Voltage	V_{IN}	-0.5	V_{CC}	V
Operating Current	I_{op}	---	400	mA
Output Current	I_o	---	50	mA
Soldering Temperature (10 sec. on leads)	T_{sd}	---	260	°C

General Transmitter Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Voltage ¹	ΔV_i	0.4	---	2.0	V
Differential Input Impedance ²	Z	---	100	---	ohm
Side Mode Suppression Ratio	$SMSR$	30	---	---	dB
Rise/Fall Time (20% - 80%)	T_r/T_f	---	---	260	ps
Relative Intensity Noise	RIN	---	---	-120	dB/Hz
TX Disable Asserted	P_{OFF}	---	---	-45	dBm
Total Jitter	T_j	---	---	227	ps
TX Fault Output - Low	V_{FL}	0	---	0.5	V
TX Fault Output - High	V_{FH}	2.4	---	V_{CC}	V
TX Disable Voltage - Low	V_{DL}	0	---	0.5	V
TX Disable Voltage - High	V_{DH}	2.4	---	V_{CC}	V
TX Disable Deassert Time	T_{disass}	---	---	1.0	ms
TX Disable Assert Time	T_{ass}	---	---	10	μs
TX Fault from Fault to Assertion	T_{fault}	---	---	100	μs
TX Disable Time to Start Reset	T_{reset}	10	---	---	μs
Time to Initialize	T_{as}	---	---	300	ms

Notes:

1. Module is designed for AC coupling. DC voltage will be filtered by internal capacitor.
2. Single ended will be 50 ohm for each signal line.
3. Optical eye diagram is compliant with IEEE 802.3z standard.

Class 1 Laser Product Complies with 21 CFR 1040.10 and 1040.11
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General Receiver Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Output Voltage ¹	ΔV_o	0.5	---	1.2	V
Differential Input Impedance ²	Z	---	100	---	Ohm
Optical Return Loss	OL	12	---	---	dB
Rise/Fall Time (20% - 80%)	T_r/T_f	---	---	350	ps
Signal Detect Hysteresis	$P_{RL+} - P_{RL-}$	1	---	---	dB
Serial ID Clock Rate	f_C	---	---	100	kHz
RX Signal Loss Output - High	V_{RL+}	2.4	---	V_{CC}	V
RX Signal Loss Output - Low	V_{RL-}	0	---	0.5	V
RX Signal Loss Assert Time	T_{RL+}	---	---	100	μ s
RX Signal Loss Deassert Time	T_{RL-}	---	---	100	μ s

Notes:

1. Module is designed for AC LVPECL coupling. See the design guide for proper termination.
2. Single ended will be 50 ohm for each signal line.

Class 1 Laser Product Complies with 21 CFR 1040.10 and 1040.11
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Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Optical Output Power ¹	P_o	-4	---	+1	dBm
Spectral Width (-20 dB)	$\Delta\lambda$	---	---	1	nm
Extinction Ratio	ET	7	---	---	dB
Center Wavelength – 1270 nm	λ_c	1264.5	1270	1277.5	nm
Center Wavelength – 1290 nm	λ_c	1284.5	1290	1297.5	nm
Center Wavelength – 1310 nm	λ_c	1304.5	1310	1317.5	nm
Center Wavelength – 1330 nm	λ_c	1324.5	1330	1337.5	nm
Center Wavelength – 1350 nm	λ_c	1344.5	1350	1357.5	nm
Center Wavelength – 1370 nm	λ_c	1364.5	1370	1377.5	nm
Center Wavelength – 1390 nm	λ_c	1384.5	1390	1397.5	nm
Center Wavelength – 1410 nm	λ_c	1404.5	1410	1417.5	nm
Center Wavelength – 1430 nm	λ_c	1424.5	1430	1437.5	nm
Center Wavelength – 1450 nm	λ_c	1444.5	1450	1457.5	nm

Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Operating Wavelength	λ_c	1260	---	1620	nm
Receiver Overload	P_{max}	-1	---	---	dBm
Receiver Sensitivity ²	P_I	---	---	-24	dBm
RX Signal Loss – Asserted	P_{RL+}	---	---	-24	dBm
RX Signal Loss – Deasserted	P_{RL-}	-35	---	---	dBm

Notes:

1. Output of coupling optical power into 9/125 μ m SMF.
2. Test at 1.25 Gb/s, 2⁷ – 1 PRBS data pattern, and > 1x10⁻¹² of Bit-Error-Rate (BER).
3. Optical eye diagram is compliant with IEEE 802.3z standard.
4. Maximum supply current for the transceiver from Vcc is 300 mA.

Class 1 Laser Product Complies with 21 CFR 1040.10 and 1040.11
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Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Optical Output Power ¹	P_o	0	---	+5	dBm
Spectral Width (-20 dB)	$\Delta\lambda$	---	---	1	nm
Extinction Ratio	ET	7	---	---	dB
Center Wavelength – 1270 nm	λ_c	1264.5	1270	1277.5	nm
Center Wavelength – 1290 nm	λ_c	1284.5	1290	1297.5	nm
Center Wavelength – 1310 nm	λ_c	1304.5	1310	1317.5	nm
Center Wavelength – 1330 nm	λ_c	1324.5	1330	1337.5	nm
Center Wavelength – 1350 nm	λ_c	1344.5	1350	1357.5	nm
Center Wavelength – 1370 nm	λ_c	1364.5	1370	1377.5	nm
Center Wavelength – 1390 nm	λ_c	1384.5	1390	1397.5	nm
Center Wavelength – 1410 nm	λ_c	1404.5	1410	1417.5	nm
Center Wavelength – 1430 nm	λ_c	1424.5	1430	1437.5	nm
Center Wavelength – 1450 nm	λ_c	1444.5	1450	1457.5	nm

Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Operating Wavelength	λ_c	1260	---	1620	nm
Receiver Overload	P_{max}	-1	---	---	dBm
Receiver Sensitivity ²	P_I	---	---	-24	dBm
RX Signal Loss – Asserted	P_{RL+}	---	---	-24	dBm
RX Signal Loss – Deasserted	P_{RL-}	-35	---	---	dBm

Notes:

1. Output of coupling optical power into 9/125 μ m SMF.
2. Test at 1.25 Gb/s, 2⁷ – 1 PRBS data pattern, and > 1x10⁻¹² of Bit-Error-Rate (BER).
3. Optical eye diagram is compliant with IEEE 802.3z standard.
4. Maximum supply current for the transceiver from Vcc is 300 mA.

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Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Optical Output Power ¹	P_o	0	---	+5	dBm
Spectral Width (-20 dB)	$\Delta\lambda$	---	---	1	nm
Extinction Ratio	ET	7	---	---	dB
Center Wavelength – 1270 nm	λ_c	1264.5	1270	1277.5	nm
Center Wavelength – 1290 nm	λ_c	1284.5	1290	1297.5	nm
Center Wavelength – 1310 nm	λ_c	1304.5	1310	1317.5	nm
Center Wavelength – 1330 nm	λ_c	1324.5	1330	1337.5	nm
Center Wavelength – 1350 nm	λ_c	1344.5	1350	1357.5	nm
Center Wavelength – 1370 nm	λ_c	1364.5	1370	1377.5	nm
Center Wavelength – 1390 nm	λ_c	1384.5	1390	1397.5	nm
Center Wavelength – 1410 nm	λ_c	1404.5	1410	1417.5	nm
Center Wavelength – 1430 nm	λ_c	1424.5	1430	1437.5	nm
Center Wavelength – 1450 nm	λ_c	1444.5	1450	1457.5	nm

Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Operating Wavelength	λ_c	1260	---	1620	nm
Receiver Overload	P_{max}	-1	---	---	dBm
Receiver Sensitivity ²	P_I	---	---	-27	dBm
RX Signal Loss – Asserted	P_{RL+}	---	---	-27	dBm
RX Signal Loss – Deasserted	P_{RL-}	-35	---	---	dBm

Notes:

1. Output of coupling optical power into 9/125 μ m SMF.
2. Test at 1.25 Gb/s, 2⁷ – 1 PRBS data pattern, and > 1x10⁻¹² of Bit-Error-Rate (BER).
3. Optical eye diagram is compliant with IEEE 802.3z standard.
4. Maximum supply current for the transceiver from Vcc is 300 mA.

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Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Optical Output Power ¹	P_o	0	---	+5	dBm
Spectral Width (-20 dB)	$\Delta\lambda$	---	---	1	nm
Extinction Ratio	ET	7	---	---	dB
Center Wavelength – 1270 nm	λ_c	1264.5	1270	1277.5	nm
Center Wavelength – 1290 nm	λ_c	1284.5	1290	1297.5	nm
Center Wavelength – 1310 nm	λ_c	1304.5	1310	1317.5	nm
Center Wavelength – 1330 nm	λ_c	1324.5	1330	1337.5	nm
Center Wavelength – 1350 nm	λ_c	1344.5	1350	1357.5	nm
Center Wavelength – 1370 nm	λ_c	1364.5	1370	1377.5	nm
Center Wavelength – 1390 nm	λ_c	1384.5	1390	1397.5	nm
Center Wavelength – 1410 nm	λ_c	1404.5	1410	1417.5	nm
Center Wavelength – 1430 nm	λ_c	1424.5	1430	1437.5	nm
Center Wavelength – 1450 nm	λ_c	1444.5	1450	1457.5	nm

Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Operating Wavelength	λ_c	1260	---	1620	nm
Receiver Overload	P_{max}	-8	---	---	dBm
Receiver Sensitivity ²	P_I	---	---	-30	dBm
RX Signal Loss – Asserted	P_{RL+}	---	---	-30	dBm
RX Signal Loss – Deasserted	P_{RL-}	-45	---	---	dBm

Notes:

1. Output of coupling optical power into 9/125 μ m SMF.
2. Test at 1.25 Gb/s, 2⁷ – 1 PRBS data pattern, and > 1x10⁻¹² of Bit-Error-Rate (BER).
3. Optical eye diagram is compliant with IEEE 802.3z standard.
4. Maximum supply current for the transceiver from Vcc is 320 mA.

Class 1 Laser Product Complies with 21 CFR 1040.10 and 1040.11
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