10 Gb/s, 80 km, 50 GHz Tunable DWDM ITU Channels XFP Dual LC Package

OptixCom Connect with Light

10G Small Form Pluggable (XFP) Transceivers

Description

OptixCom's DWDM tunable XFP fiber optics transceivers are designed with monolithic C-band MZM laser and APD receiver. They utilize 50 GHz ITU channel spacing with integrated wavelength locker, and support Line-side and XFI loopback. There is no need to use the reference clock for this transceiver design. It is compliant with 10G Ethernet and Fiber Channel for datacom applications and SONET/SDH for telecom applications. The transceiver is compliant with XFP Multi-Source Agreement (MSA) INF-8077i and Tunable XFP for ITU Frequency Grid Applications (SFF-8477).

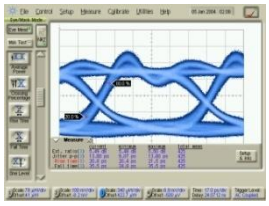
The transceiver uses duplex LC connector for the optical interface. It is hot pluggable in the z-axis with a 30-pin connector. The transceiver has > 23 dB power budget for 80 km of transmission distance with standard single mode fibers. The product is RoHS compliant. Total power consumption is < 3.5W.

Lead-Free

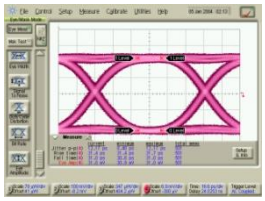
XFP-10000DXT-AT80K

10 Gb/s, 2^{23}-1 NRZ data eye pattern

TX



RX



Key Features

- 10 Gb/s data rate, cover all ITU channels
- > 23 dB power budget for 80 km
- Available for 50 GHz channel spacing
- Duplex LC connector optical interface
- 30-pin Z-axis hot pluggable connector
- AC coupling CML differential I/O logics
- Compliant with XFP MSA standard
- Compliant with IEEE 802.3ae, 10GBASE-ZW/ZR
- Compliant with 10G FC Fiber Channel Standard
- RoHS compliant

Ordering Information

Part Number: XFP-10000DXT-AT80K
Description:
10 Gb/s, 50 GHz tunable DWDM single mode, XFP fiber optics transceiver, 80 km, 0 -70°C

Applications

- ✓ 10G Fiber Channel, 10 Gigabit Ethernet
- ✓ SONET OC-192/SDH STM-64
- ✓ Data Communication for SAN and LAN
- ✓ Central offices routers and switches
- ✓ Mass storage systems interconnect
- ✓ Computer cluster cross-connect

Operating Conditions

Parameter	Min.	Typical	Max.	Units
Operate Temperature	0	25	70	°C
Data Rate	9.95	---	11.3	Gb/s
Supply Voltage (3.3V)	3.13	3.3	3.47	V
Supply Voltage (5V)	4.75	5.0	5.25	V

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Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	*Tst*	-40	85	°C
Supply Voltage (3.3/5.0 V)	*Vcc*	-0.5	4.0/6.0	V
Input Voltage	*VIN*	-0.5	*Vcc*	V
Operating Current (3.3/5.0 V)	*Iop*	---	450/350	mA
Output Current	*Io*	---	50	mA

General Transmitter Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Voltage [1]	*ΔVi*	0.2	---	0.8	V
Differential Input Impedance [2]	*Z*	---	100	---	ohm
Total Jitter	*Tj*	---	---	0.1	UI
TX Fault Output – Low	*VFL*	0	---	0.5	V
TX Fault Output – High	*VFH*	2.0	---	*Vcc*	V
TX Disable Voltage – Low	*VDL*	0	---	0.5	V
TX Disable Voltage – High	*VDH*	2.0	---	*Vcc*	V
TX Disable Deassert Time	*Tdisass*	---	---	1.0	ms
TX Disable Assert Time	*Tass*	---	---	10	µs
TX Fault from Fault to Assertion	*Tfault*	---	---	100	µs
TX Disable Time to Start Reset	*Treset*	10	---	---	µs
Time to Initialize	*Tas*	---	---	300	ms

General Receiver Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Output Voltage[1]	*ΔVo*	0.4	---	0.8	V
Differential Input Impedance [2]	*Z*	---	100	---	Ohm
Dispersion Penalty		---	---	2	dB
RX Signal Loss Output - High	*VRL+*	2.4	---	*Vcc*	V
RX Signal Loss Output - Low	*VRL-*	0	---	0.5	V
RX Signal Loss Assert Time	*TRL+*	---	---	100	µs
RX Signal Loss Deassert Time	*TRL-*	---	---	100	µs

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. Refer to OptixCom "XFP Design Reference Guide" or IEEE 802.3ae for more design details.

DWDM ITU Grid Wavelength Guide

ITU Code	Frequency (THz)	Wavelength (nm)	ITU Code	Frequency (THz)	Wavelength (nm)
1	191.75	1563.45	45	193.95	1545.72
2	191.80	1563.05	46	194.00	1545.32
3	191.85	1562.64	47	194.05	1544.92
4	191.90	1562.23	48	194.10	1544.53
5	191.95	1561.83	49	194.15	1544.13
6	192.00	1561.42	50	194.20	1543.73
7	192.05	1561.01	51	194.25	1543.33
8	192.10	1560.61	52	194.30	1542.94
9	192.15	1560.20	53	194.35	1542.54
10	192.20	1559.79	54	194.40	1542.14
11	192.25	1559.39	55	194.45	1541.75
12	192.30	1558.98	56	194.50	1541.35
13	192.35	1558.58	57	194.55	1540.95
14	192.40	1558.17	58	194.60	1540.56
15	192.45	1557.77	59	194.65	1540.16
16	192.50	1557.36	60	194.70	1539.77
17	192.55	1556.96	61	194.75	1539.37
18	192.60	1556.55	62	194.80	1538.98
19	192.65	1556.15	63	194.85	1538.58
20	192.70	1555.75	64	194.90	1538.19
21	192.75	1555.34	65	194.95	1537.79
22	192.80	1554.94	66	195.00	1537.40
23	192.85	1554.54	67	195.05	1537.00
24	192.90	1554.13	68	195.10	1536.61
25	192.95	1553.73	69	195.15	1536.22
26	193.00	1553.33	70	195.20	1535.82
27	193.05	1552.93	71	195.25	1535.43
28	193.10	1552.52	72	195.30	1535.04
29	193.15	1552.12	73	195.35	1534.64
30	193.20	1551.72	74	195.40	1534.25
31	193.25	1551.32	75	195.45	1533.86
32	193.30	1550.92	76	195.50	1533.47
33	193.35	1550.52	77	195.55	1533.07
34	193.40	1550.12	78	195.60	1532.68
35	193.45	1549.72	79	195.65	1532.29
36	193.50	1549.32	80	195.70	1531.90

DWDM ITU Grid Wavelength Guide (Cont.)

ITU Code	Frequency (THz)	Wavelength (nm)	ITU Code	Frequency (THz)	Wavelength (nm)
37	193.55	1548.91	81	195.75	1531.51
38	193.60	1548.51	82	195.80	1531.12
39	193.65	1548.11	83	195.85	1530.72
40	193.70	1547.72	84	195.90	1530.33
41	193.75	1547.32	85	195.95	1529.94
42	193.80	1546.92	86	196.00	1529.55
43	193.85	1546.52	87	196.05	1529.16
44	193.90	1546.12	88	196.10	1528.77

Notes:

1. The initial setting of ITU channel or wavelength of the tunable optical transceiver is ITU-1, 1563.45nm when it's plugged in for the first time. Afterward the transceiver can be set to any ITU channel 17-61 as shown above.
2. The transceiver will remember the last channel setting after power cycling in normal operating condition.
3. When Tx_DIS pin is activated, the channel memory will be cleared. A new channel command must be entered to set the new channel.
4. When Tx_DIS is activated and then de-activated, the transceiver will return the last channel memory setting.
5. Refer to OptixCom website for "ITU-T G.693" for more ITU channel details.

Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Optical Output Power [1]	P_O	-1	---	+3	dBm
Extinction Ratio	ET	9	---	---	dB
Operating Wavelength	λ_C	λ_C - 25	λ_C	λ_C + 25	nm
Center Wavelength Spacing	f_S	---	100	---	GHz
TX Disable Asserted	P_{OFF}	---	---	-30	dBm
Transmitter & Dispersion Penalty	TDP	---	---	3	dB
Center Frequency (Start of Life)	f_C	f_C – 1.5	f_C	f_C + 1.5	GHz
Center Frequency (End of Life)	f_C	f_C – 2.5	f_C	f_C + 2.5	GHz

Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Operating Wavelength	λ_C	1528	---	1564	nm
Receiver Overload	P_{max}	--	---	-7	dBm
Receiver Sensitivity [2]	P_I	---	---	-24	dBm
Receiver Sensitivity in OMA [2]	P_I	---	---	-21	dBm
RX Signal Loss – Asserted	P_{RL+}	---	---	-27	dBm
RX Signal Loss – Deasserted	P_{RL-}	-37	---	---	dBm

Notes:

1. Output of coupling optical power into 9/125 μm SMF.
2. Test at 10 Gb/s, 2^{31} – 1 PRBS data pattern, and > $1x10^{-12}$ of Bit-Error-Rate (BER).

Class 1 Laser Product
Complies with
21 CFR 1040.10 and 1040.11

Underwriters Laboratories

TÜVRheinland

Lead-Free

DWDM ITU Grid Wavelength Guide

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17	191.7	1563.86	40	194.0	1545.32
18	191.8	1563.05	41	194.1	1544.53
19	191.9	1562.23	42	194.2	1543.73
20	192.0	1561.42	43	194.3	1542.94
21	192.1	1560.61	44	194.4	1542.14
22	192.2	1559.79	45	194.5	1541.35
23	192.3	1558.98	46	194.6	1540.56
24	192.4	1558.17	47	194.7	1539.77
25	192.5	1557.36	48	194.8	1538.98
26	192.6	1556.56	49	194.9	1538.19
27	192.7	1555.75	50	195.0	1537.40
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30	193.0	1553.33	53	195.3	1535.04
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32	193.2	1551.72	55	195.5	1533.47
33	193.3	1550.92	56	195.6	1532.68
34	193.4	1550.12	57	195.7	1531.90
35	193.5	1549.32	58	195.8	1531.12
36	193.6	1548.52	59	195.9	1530.33
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