

10 Gb/s, 40 - 80 km DWDM ITU Channels 17 - 61 SFP+ Dual LC Package



Description

OptixCom's DWDM SFP+ fiber optics transceivers are designed with high performance EML laser and PIN/APD receiver. They are used in 100 GHz channel spacing DWDM systems. It is compliant with 10G Ethernet and Fiber Channel for datacom applications and SONET/SDH for telecom applications. Our transceivers cover the ITU channels from 17 to 61. It is compliant with SFP Multi-Source Agreement (MSA).

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 > 15 dB power budget for 40 km, and > 23 dB for 80 km of transmission distance with standard single mode fibers. The product is RoHS compliant. Total power consumption is < 2W.



Lead-Free

SFP-10000DX-AT40K-XX
SFP-10000DX-AT80K-XX



Key Features

- Cover ITU channels 17-61, 10 Gb/s data rate.
- > 15 dB power budget for 40 km
- > 23 dB power budget for 80 km
- Duplex LC connector optical interface
- Compliant with IEEE 802.3ae, 10GBASE-LW/LR
- Compliant with 10G FC Fiber Channel Standard
- Z-axis hot pluggable
- AC coupling LVPECL differential I/O logics
- SFF-8431MSA Compliant
- Single 3.3 V power supply
- RoHS compliant

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

Ordering Information

Part Number: SFP-10000DX-AT40K-XX
Description:

DWDM, 10 Gb/s, single mode, SFP+ fiber optics transceiver, 40 km, XX ITU channel code 17-61, 0-70°C.

Part Number: SFP-10000DX-AT80K-XX
Description:

DWDM, 10 Gb/s, single mode, SFP+ fiber optics transceiver, 80 km, XX ITU channel code 17-61, 0-70°C

XX specifies ITU channel code associated with the wavelength. For example, SFP-10000DX-AT40K-17 is the ITU-17 channel with the 1563.86 nm wavelength and 191.7 THz frequency.

Operating Conditions

Parameter	Min.	Typical	Max.	Units
Operate Temperature	0	25	70	°C
Data Rate	9.95	---	11.3	Gb/s
Supply Voltage	3.13	3.3	3.47	V
Supply Current	---	350	400	mA

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Page 1

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DWDM ITU Grid Wavelength Guide

ITU Code	Frequency (THz)	Wavelength (nm)	ITU Code	Frequency (THz)	Wavelength (nm)
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
28	192.8	1554.94	51	195.1	1536.61
29	192.9	1554.13	52	195.2	1535.82
30	193.0	1553.33	53	195.3	1535.04
31	193.1	1552.52	54	195.4	1534.25
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
37	193.7	1547.72	60	196.0	1529.55
38	193.8	1546.92	61	196.1	1528.77
39	193.9	1546.12			

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	T_{st}	-40	85	°C
Supply Voltage	V_{cc}	-0.5	3.8	V
Input Voltage	V_{in}	-0.5	V_{cc}	V
Relative Humidity	$R.H.$	0	85	%
Output Current	I_o	---	50	mA

General Transmitter Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Voltage ¹	ΔV_i	0.2	---	0.8	V
Differential Input Impedance ²	Z	---	100	---	ohm
Spectral Width (-20 dB)	$\Delta\lambda$	---	0.1	0.3	nm
Side Mode Suppression Ratio	SMSR	30	---	---	dB
Channel Spacing	Δf	---	100	---	GHz
Total Jitter	T_j	---	---	0.1	UI
Relative Intensity Noise	RIN	---	---	-130	dB/Hz
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	μ s
TX Fault from Fault to Assertion	T_{fault}	---	---	100	μ s
TX Disable Time to Start Reset	T_{reset}	10	---	---	μ s
Time to Initialize	T_{as}	---	---	300	ms

General Receiver Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Output Voltage ¹	ΔV_o	0.4	---	0.8	V
Differential Input Impedance ²	Z	---	100	---	Ohm
Optical Return Loss	OL	27	---	---	dB
Rise/Fall Time (20% - 80%)	T_r/T_f	---	---	40	ps
Dispersion Penalty		---	---	2	dB
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 coupling. DC voltage will be filtered by internal capacitor.
2. Single ended will be 50 ohm for each signal line.
3. Refer to OptixCom "SFP Design Reference Guide" for more design details.

Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Optical Output Power ¹	P_o	0	---	+5	dBm
Extinction Ratio	ET	8.2	---	---	dB
TX Disable Asserted	P_{OFF}	---	---	-30	dBm
Center Wavelength (Start of Life)	λ_c	$\lambda_c - 25$	λ_c	$\lambda_c + 25$	pm
Center Wavelength (End of Life)	λ_c	$\lambda_c - 100$	λ_c	$\lambda_c + 100$	pm

Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Operating Wavelength	λ_c	1528	---	1564	nm
Receiver Overload	P_{max}	--	---	-6	dBm
Receiver Sensitivity ²	P_I	---	---	-23	dBm
Receiver Sensitivity in OMA ²	P_I	---	---	-20	dBm
RX Signal Loss – Asserted	P_{RL+}	---	---	-26	dBm
RX Signal Loss – Deasserted	P_{RL-}	-32	---	---	dBm

Notes:

1. Output of coupling optical power into 9/125 μm SMF.
2. Test at 10 Gb/s, 2³¹ – 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

