

**10 Gb/s, 40 - 80 km  
CWDM 1470 - 1610 nm  
SFP+ Dual LC Package**



**Description**

OptixCom's CWDM SFP+ fiber optics transceivers are designed with high performance EML laser and APD receiver that cover the wavelength spectrum from 1470 nm to 1610 nm, with industry standard 20 nm spacing. It is compliant with 10G Ethernet and Fiber Channel for datacom applications and SONET/SDH for telecom applications. It is compliant with SFP+ Multi-Source Agreement (MSA).

The transceiver uses duplex LC connector for the optical interface. 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 < 3.5W.



Lead-Free

**SFP-10000CEX-AT40K-XX**  
**SFP-10000CEX-AT80K-XX**



**Key Features**

- CWDM 1470 - 1610 nm, 10 Gb/s data rate
- > 15 dB power budget for 40 km
- > 23 dB power budget for 80 km
- Duplex LC connector optical interface
- Z-axis hot pluggable
- AC coupling LVPECL differential I/O logics
- SFF-8431MSA Compliant
- TTL Signal detect to monitor optical signals
- 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-10000CEX-AT40K-XX  
**Description:**

CWDM, 1470 - 1610 nm, 10 Gb/s, single mode, SFP+ fiber optics transceiver, 40 km, 1XX0 nm wavelength, -5 -70°C

**Part Number:** SFP-10000CEX-AT80K-XX  
**Description:**

CWDM, 1470 - 1610 nm, 10 Gb/s, single mode, SFP+ fiber optics transceiver, 80 km, 1XX0 nm wavelength, -5 -70°C

XX specifies the wavelength described below. For example, SFP-10000CEX-AT40K-57 is the 1570 nm module.

<u>XX</u>	Wavelength	<u>XX</u>	Wavelength
47	1470 nm	55	1550 nm
49	1490 nm	57	1570 nm
51	1510 nm	59	1590 nm
53	1530 nm	61	1610 nm

**Operating Conditions**

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

### Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	$T_{st}$	-40	85	°C
Supply Voltage	$V_{cc}$	-0.5	4.0/6.0/2.0	V
Input Voltage	$V_{IN}$	-0.5	$V_{cc}$	V
Operating Current	$I_{op}$	---	400/350/750	mA
Output Current	$I_o$	---	50	mA

### General Transmitter Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Voltage <sup>1</sup>	$\Delta V_i$	0.2	---	0.8	V
Differential Input Impedance <sup>2</sup>	$Z$	---	100	---	ohm
Spectral Width (-20 dB)	$\Delta\lambda$	---	0.1	0.3	nm
Side Mode Suppression Ratio	$SMSR$	30	---	---	dB
Relative Intensity Noise	$RIN$	---	---	-130	dB/Hz
Total Jitter	$T_j$	---	---	0.1	UI
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.

Class 1 Laser Product  
Complies with  
21 CFR 1040.10 and 1040.11



### General Receiver Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Output Voltage	$\Delta V_o$	0.4	---	0.8	V
Differential Input Impedance <sup>1</sup>	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	---	0.8	V
RX Signal Loss Assert Time	$T_{RL+}$	---	---	100	$\mu$ s
RX Signal Loss Deassert Time	$T_{RL-}$	---	---	100	$\mu$ s

Notes:

- Single ended will be 50 ohm for each signal line.

### Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Optical Output Power <sup>1</sup> (SFP-10000CEX-AT40K-XX)	$P_o$	-1	---	+2	dBm
Optical Output Power <sup>1</sup> (SFP-10000CEX-AT80K-XX)	$P_o$	0	---	+4	dBm
Spectral Width (-20 dB)	$\Delta\lambda$	---	0.1	0.3	nm
Extinction Ratio	ET	8.2	---	---	dB
TX Disable Asserted	$P_{OFF}$	---	---	-40	dBm
Center Wavelength – 1470 nm	$\lambda_c$	1464.5	1470	1477.5	nm
Center Wavelength – 1490 nm	$\lambda_c$	1484.5	1490	1497.5	nm
Center Wavelength – 1510 nm	$\lambda_c$	1504.5	1510	1517.5	nm
Center Wavelength – 1530 nm	$\lambda_c$	1524.5	1530	1537.5	nm
Center Wavelength – 1550 nm	$\lambda_c$	1544.5	1550	1557.5	nm
Center Wavelength – 1570 nm	$\lambda_c$	1564.5	1570	1577.5	nm
Center Wavelength – 1590 nm	$\lambda_c$	1584.5	1590	1597.5	nm
Center Wavelength – 1610 nm	$\lambda_c$	1604.5	1610	1617.5	nm

Notes:

- Output of coupling optical power into 9/125  $\mu$ m SMF.

**SFP-10000CEX-AT40K-XX**

**Receiver Electro-Optical Characteristics**

Parameter	Symbol	Min.	Typical	Max.	Units
Operating Wavelength	$\lambda_c$	1260	---	1620	nm
Receiver Overload	$P_{max}$	--	---	-1	dBm
Receiver Sensitivity <sup>1</sup>	$P_I$	---	---	-16	dBm
Receiver Sensitivity in OMA <sup>1</sup>	$P_I$	---	---	-14.1	dBm
RX Signal Loss – Asserted	$P_{RL+}$	---	---	-22	dBm
RX Signal Loss – Deasserted	$P_{RL-}$	-28	---	---	dBm

**SFP-10000CEX-AT80K-XX**

**Receiver Electro-Optical Characteristics**

Parameter	Symbol	Min.	Typical	Max.	Units
Operating Wavelength	$\lambda_c$	1260	---	1620	nm
Receiver Overload	$P_{max}$	--	---	-7	dBm
Receiver Sensitivity <sup>1</sup>	$P_I$	---	---	-23	dBm
Receiver Sensitivity in OMA <sup>1</sup>	$P_I$	---	---	-22	dBm
RX Signal Loss – Asserted	$P_{RL+}$	---	---	-24	dBm
RX Signal Loss – Deasserted	$P_{RL-}$	-34	---	---	dBm

1. Test at 10 Gb/s, 2<sup>31</sup> – 1 PRBS data pattern, and > 1x10<sup>-12</sup> of Bit-Error-Rate (BER).

Class 1 Laser Product  
Complies with  
21 CFR 1040.10 and 1040.11

