

# SFP+ Small Form Pluggable Optical Transceivers



## Features

- 850 nm multimode, 1310/1550 nm single mode, CWDM, DWDM
- Digital diagnostic & monitoring (DDM) function available
- 6.25 Gb/s to 10 Gb/s, 150 m to 80 km
- Duplex LC connector, Z-axis hot pluggable
- AC coupling LVPECL differential I/O, TTL signal detect

## Applications

- ✓ Ethernet, Fiber Channel, ATM/SONET, SDH
- ✓ High speed I/O bus extension, systems interconnects
- ✓ Video over fiber links, media converters
- ✓ Data Communication for SAN and LAN
- ✓ Routers and switches, computer cluster cross-connect



## Products Selection Guide

Part Number *	Wavelength	Data Rate	Power Budget	Distance **	Temp. Range
<b>6.25 Gb/s Single Mode Applications</b>					
SFP-6250LX-AT2K	1310 nm	6.25 Gb/s	>8dB	2 km	0 – 70/-40 – 85°C
SFP-6250LX-AT10K	1310 nm	6.25 Gb/s	>8dB	10 km	0 – 70/-40 – 85°C
<b>8.5 Gb/s Single Mode &amp; Multimode Applications</b>					
SFP-8500SX-AT150M	850 nm	8.5 Gb/s	>4 dB	150 m	0 – 70°C
SFP-8500LX-AT10K	1310 nm	8.5 Gb/s	>5 dB	10 km	0 – 70°C
<b>10 Gb/s Single Mode &amp; Multimode Applications</b>					
SFP-10000SX-AT300M	850 nm	10 Gb/s	> 5 dB	300 m	0 – 70°C
SFP-10000LX-AT2K	1310 nm	10 Gb/s	>6 dB	2 km	0 – 70°C
SFP-10000LX-AT10K	1310 nm	10 Gb/s	>6 dB	10 km	0 – 70°C
SFP-10000LX-AT20K	1310 nm	10 Gb/s	>12 dB	20 km	0 – 70°C
SFP-10000EX-AT40K	1550 nm	10 Gb/s	>15 dB	40 km	-5 – 70°C
SFP-10000EX-AT80K	1550 nm	10 Gb/s	>23 dB	80 km	-5 – 70°C
<b>10 Gb/s, Single Mode, CWDM &amp; DWDM Applications, 10 – 80 km</b>					
SFP-10000CLX-AT10K-XX	1270 - 1450 nm	10 Gb/s	>6 dB	10 km	0 – 70°C
SFP-10000CEX-AT40K-XX	1470 -1610 nm	10 Gb/s	>15dB	40 km	0 – 70°C
SFP-10000CEX-AT80K-XX	1470 -1610 nm	10 Gb/s	>23 dB	80 km	0 – 70°C
SFP-10000DEX-AT40K-XX	ITU 17 – 61	10 Gb/s	>15 dB	40 km	-5 – 70°C
SFP-10000DEX-AT80K-XX	ITU 17 - 59	10 Gb/s	>23 dB	80 km	-5 – 70°C

\*: Add "-T" in the Part Number for products with extended temperature range -40-85 °C. For example, SFP-6250LX-AT10K-T.  
XX indicates wavelength selection for the 1270 – 1610 nm CWDM transceivers. See data sheet for details.

\*\* : The indicated distance is for reference only, not guaranteed specifications. The actual transmission distance depends on system configuration and power budget. For single mode fibers, the typical loss is 0.25 dB/km @ 1550 nm and 0.35 dB/km @ 1310 nm.

# Multi-Rate 1.25 – 6.25 Gb/s 1310 nm Single Mode, 2 km SFP+ Dual LC Connector



## Description

OptixCom's multi-rate fiber optics transceiver is designed for data rate 1.25 to 6.25 Gb/s. This single mode module uses high performance 1310 nm FP laser and is compliant with Small Form Pluggable Plus (SFP+) specifications. The optical connector interface is dual LC.

The module is compliant with SFP+ Multi-Source Agreement (MSA). The transceiver reaches 2 km of distance with standard single mode fibers and 8 dB of power budget. The products are RoHS compliant. The total power consumption is < 1W.



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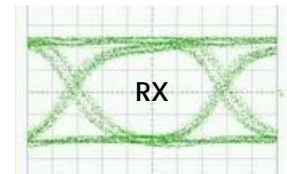
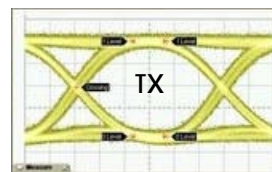
SFP-6250LX-AT2K



## Key Features

- 1310 nm single mode
- Multi-rate from 1.25 to 6.25 Gb/s
- > 8 dB power budget, 2 km reach
- Duplex LC connector optical interface
- Z-axis hot pluggable
- SFF-8472 MSA Compliant
- AC coupling LVPECL differential I/O logics
- Single 3.3 V power supply
- -40–85 °C operating temperatures available
- TTL signal detect to monitor optical signals
- RoHS compliant

6.25 Gb/s, 2<sup>7</sup>-1 NRZ Data Eye Pattern



## Applications

- ✓ Fiber Channel, Gigabit Ethernet
- ✓ High speed I/O for file server
- ✓ Video over fiber links
- ✓ Media converter
- ✓ Data Communication for SAN and LAN
- ✓ Industrial Control Link
- ✓ Central offices routers and switches
- ✓ Mass storage systems interconnect

## Ordering Information

**Part Number:** SFP-6250LX-AT2K

**Description:**

1310 nm, 1 to 6.25 Gb/s, single mode, SFP+ fiber optics transceiver, 2 km reach, 0-70°C

\* Add "-T" in the Part Number for extended temperature range -40–85 °C, i.e., SFP-6250LX-AT2K-T.

## Operating Conditions

Parameter	Min.	Typical	Max.	Units
Operate Temperature	0	25	70	°C
- T Transceivers	-40	25	85	°C
Data Rate	1	---	6.25	Gb/s
Supply Voltage	3.15	3.3	3.45	V
Supply Current	---	220	300	mA

### Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	$T_{st}$	-40	85	°C
Supply Voltage	$V_{cc}$	-0.5	4.0	V
Input Voltage	$V_{in}$	-0.5	$V_{cc}$	V
Output Current	$I_o$	---	50	mA
Soldering Temperature (10 sec. on leads)	$T_{sd}$	---	260	°C

### Transmitter Electro-Optical 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
Optical Output Power <sup>3</sup>	$P_o$	-6.0	---	-0.5	dBm
Optical Wavelength	$\lambda_o$	1284	1310	1345	nm
Relative Intensity Noise	$RIN$	---	---	-128	dB/Hz
Extinction Ratio	$ET$	4	---	---	dB
TX Disable Power	$P_{TD}$	---	---	-30	dBm
Spectral Width (rms)	$\Delta\lambda$	---	---	1	nm
TX Disable Voltage – High	$V_{DH}$	2.4	---	$V_{cc}$	V
TX Disable Voltage - Low	$V_{DL}$	0	---	0.5	V
TX Fault Output - High	$V_{FH}$	2.4	---	$V_{cc}$	V
TX Fault Output - Low	$V_{FL}$	0	---	0.5	V
TX Disable Assert Time	$T_{ass}$	---	---	10	μs
TX Disable Deassert Time	$T_{disass}$	---	---	1.0	ms
Time to Initialize	$T_{as}$	---	---	300	ms
TX Fault from Fault to Assertion	$T_{fault}$	---	---	100	μs
TX Disable Time to Start Reset	$T_{reset}$	10	---	---	μs

Notes:

1. Applied to AC LVPECL I/O coupling. See the design guide for proper termination.
2. Single ended will be 50 ohm for each signal line.
3. Output of coupling optical power into 9/125 μm SMF.

Class 1 Laser Product  
Complies with  
21 CFR 1040.10 and 1040.11



### Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Impedance	$Z$	---	100	---	Ohm
Differential Output Voltage <sup>1</sup>	$\Delta V_o$	0.4	---	0.8	V
Operating Wavelength	$\lambda_c$	1260	1310	1360	nm
Receiver Overload	$P_{max}$	+0.5	---	---	dBm
Receiver Sensitivity <sup>2</sup>	$P_I$	---	---	-14.4	dBm
Receiver Sensitivity in OMA	$P_{IOMA}$	---	---	-12.6	dBm
Stressed Receiver Sensitivity <sup>2</sup> (OMA)	$P_I$	---	---	-10.3	dBm
Optical Return Loss	$OL$	12	---	---	dB
RX Signal Loss – Deasserted	$P_{RL-}$	-30	---	---	dBm
RX Signal Loss – Asserted	$P_{RL+}$	---	---	-16	dBm
Signal Detect Hysteresis	$P_{RL+} - P_{RL-}$	0.5	---	---	dB
RX Signal Loss Assert Time	$T_{RL+}$	---	---	100	$\mu$ s
RX Signal Loss Deassert Time	$T_{RL-}$	---	---	100	$\mu$ s
RX Signal Loss Output - High	$V_{RL+}$	2.4	---	$V_{CC}$	V
RX Signal Loss Output - Low	$V_{RL-}$	0	---	0.5	V

Notes:

1. Applied to AC LVPECL I/O coupling. See the design guide for proper termination.
2. Test at 6.25 Gb/s, 2<sup>7</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



# Multi-Rate 1.25 – 6.25 Gb/s 1310 nm Single Mode, 10 km SFP+ Dual LC Connector



## Description

OptixCom's multi-rate fiber optics transceiver is designed for data rate 1.25 to 6.25 Gb/s. This single mode module uses high performance 1310 nm DFB laser and is compliant with Small Form Pluggable Plus (SFP+) specifications. The optical connector interface is dual LC.

The module is compliant with SFP+ Multi-Source Agreement (MSA). The transceiver reaches 10 km of distance with standard single mode fibers and 8 dB of power budget. The products are RoHS compliant. The total power consumption is < 1W.



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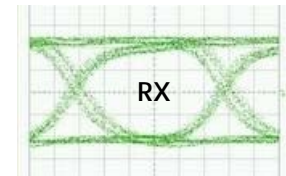
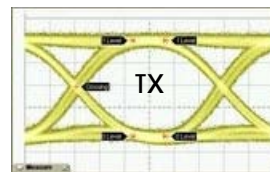
SFP-6250LX-AT10K



## Key Features

- 1310 nm single mode.
- Multi-rate from 1.25 to 6.25 Gb/s
- > 8 dB power budget, 10 km reach
- Duplex LC connector optical interface
- Z-axis hot pluggable
- SFF-8472 MSA Compliant
- AC coupling LVPECL differential I/O logics
- Single 3.3 V power supply
- -40–85 °C operating temperatures available
- TTL signal detect to monitor optical signals
- RoHS compliant

6.25 Gb/s, 2<sup>7</sup>-1 NRZ Data Eye Pattern



## Applications

- ✓ Fiber Channel, Gigabit Ethernet
- ✓ High speed I/O for file server
- ✓ Video over fiber links
- ✓ Media converter
- ✓ Data Communication for SAN and LAN
- ✓ Industrial Control Link
- ✓ Central offices routers and switches
- ✓ Mass storage systems interconnect

## Ordering Information

**Part Number:** SFP-6250LX-AT10K

### Description:

1310 nm ,1 to 6.25 Gb/s, single mode, SFP+ fiber optics transceiver, 10 km reach, 0-70°C

\* Add "-T" in the Part Number for extended temperature range -40–85 °C, i.e., SFP-6250LX-AT10K-T.

## Operating Conditions

Parameter	Min.	Typical	Max.	Units
Operate Temperature	0	25	70	°C
- T Transceivers	-40	25	85	°C
Data Rate	1	---	6.25	Gb/s
Supply Voltage	3.1	3.3	3.5	V
Supply Current	---	220	300	mA

### Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	$T_{st}$	-40	85	°C
Supply Voltage	$V_{cc}$	-0.5	4.0	V
Input Voltage	$V_{in}$	-0.5	$V_{cc}$	V
Output Current	$I_o$	---	50	mA
Soldering Temperature (10 sec. on leads)	$T_{sd}$	---	260	°C

### Transmitter Electro-Optical 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
Optical Output Power <sup>3</sup>	$P_o$	-6.0	---	-0.5	dBm
Optical Wavelength	$\lambda_o$	1284	1310	1345	nm
Relative Intensity Noise	$RIN$	---	---	-128	dB/Hz
Extinction Ratio	$ET$	4	---	---	dB
TX Disable Power	$P_{TD}$	---	---	-30	dBm
Spectral Width (-20dB)	$\Delta\lambda$	---	---	0.45	nm
TX Disable Voltage – High	$V_{DH}$	2.4	---	$V_{cc}$	V
TX Disable Voltage - Low	$V_{DL}$	0	---	0.5	V
TX Fault Output - High	$V_{FH}$	2.4	---	$V_{cc}$	V
TX Fault Output - Low	$V_{FL}$	0	---	0.5	V
TX Disable Assert Time	$T_{ass}$	---	---	10	μs
TX Disable Deassert Time	$T_{disass}$	---	---	1.0	ms
Time to Initialize	$T_{as}$	---	---	300	ms
TX Fault from Fault to Assertion	$T_{fault}$	---	---	100	μs
TX Disable Time to Start Reset	$T_{reset}$	10	---	---	μs

Notes:

1. Applied to AC LVPECL I/O coupling. See the design guide for proper termination.
2. Single ended will be 50 ohm for each signal line.
3. Output of coupling optical power into 9/125 μm SMF.

Class 1 Laser Product  
Complies with  
21 CFR 1040.10 and 1040.11



### Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Impedance	$Z$	---	100	---	Ohm
Differential Output Voltage <sup>1</sup>	$\Delta V_o$	0.4	---	0.8	V
Operating Wavelength	$\lambda_c$	1260	1310	1360	nm
Receiver Overload	$P_{max}$	+0.5	---	---	dBm
Receiver Sensitivity <sup>2</sup>	$P_I$	---	---	-14.4	dBm
Receiver Sensitivity in OMA	$P_{IOMA}$	---	---	-12.6	dBm
Stressed Receiver Sensitivity <sup>2</sup> (OMA)	$P_I$	---	---	-10.3	dBm
Optical Return Loss	$OL$	12	---	---	dB
RX Signal Loss – Deasserted	$P_{RL-}$	-30	---	---	dBm
RX Signal Loss – Asserted	$P_{RL+}$	---	---	-16	dBm
Signal Detect Hysteresis	$P_{RL+} - P_{RL-}$	0.5	---	---	dB
RX Signal Loss Assert Time	$T_{RL+}$	---	---	100	$\mu$ s
RX Signal Loss Deassert Time	$T_{RL-}$	---	---	100	$\mu$ s
RX Signal Loss Output - High	$V_{RL+}$	2.4	---	$V_{cc}$	V
RX Signal Loss Output - Low	$V_{RL-}$	0	---	0.5	V

Notes:

1. Applied to AC LVPECL I/O coupling. See the design guide for proper termination.
2. Test at 6.25 Gb/s, 2<sup>7</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



# Multi-Rate 1 – 8.5 Gb/s 850 nm Multimode, 150 m SFP+ Dual LC Connector



## Description

OptixCom's multi-rate fiber optics transceiver is designed for 1X, 2X, 4X, 8X FC, GbE, and OC48 applications with data rate up to 8.5 Gb/s. This multimode fiber optics transceiver is designed with high performance 850 nm VCSEL light source. Dual LC connectors are used as standard interface and the package is compliant with Small Form Pluggable Plus (SFP+) specifications. The optical connector interface is dual LC.

The module is compliant with SFP+ Multi-Source Agreement (MSA). The transceiver reaches more than 50 meters of transmission distance with high-grade multimode fibers and >4 dB of power budget. The products are RoHS compliant.



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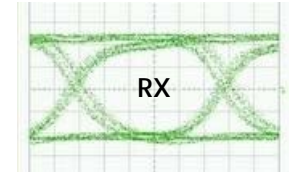
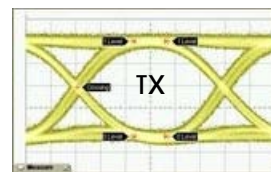
SFP-8500SX-AT150M



## Key Features

- 850 nm multimode,
- Multi-rate from 1 to 8.5 Gb/s
- > 4 dB power budget, 150 m reach
- Duplex LC connector optical interface
- Z-axis hot pluggable
- SFF-8472 MSA Compliant
- AC coupling LVPECL differential I/O logics
- Single 3.3 V power supply
- TTL or PECL signal detect to monitor optical signals
- RoHS compliant

8.5 Gb/s, 2<sup>7</sup>-1 NRZ Data Eye Pattern



## Applications

- ✓ Fiber Channel, Gigabit Ethernet
- ✓ High speed I/O for file server
- ✓ Video over fiber links
- ✓ Media converter
- ✓ Data Communication for SAN and LAN
- ✓ Industrial Control Link
- ✓ Central offices routers and switches
- ✓ Mass storage systems interconnect

## Ordering Information

**Part Number:** SFP-8500SX-AT150M

**Description:**

850 nm, 1 to 8.5 Gb/s, multimode, SFP+ fiber optics transceiver, 150 m reach, 0-70°C

## Operating Conditions

Parameter	Min.	Typical	Max.	Units
Operate Temperature	0	25	70	°C
Data Rate	1	---	8.5	Gb/s
Supply Voltage	3.1	3.3	3.5	V
Supply Current	---	200	250	mA



### Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	$T_{st}$	-40	85	°C
Supply Voltage	$V_{CC}$	-0.5	4.0	V
Input Voltage	$V_{IN}$	-0.5	$V_{CC}$	V
Operating Current	$I_{op}$	---	300	mA
Output Current	$I_o$	---	50	mA
Soldering Temperature (10 sec. on leads)	$T_{sd}$	---	260	°C

### Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Voltage <sup>1</sup>	$\Delta V_i$	0.2	---	0.9	V
Differential Input Impedance <sup>2</sup>	$Z$	---	100	---	ohm
Optical Output Power <sup>3</sup>	$P_o$	-7	---	-1	dBm
Optical Wavelength	$\lambda_o$	840	850	860	nm
Relative Intensity Noise	$RIN$	---	---	-128	dB/Hz
Optical Modulation Amplitude	$OMA$	300	---	---	$\mu$ W
TX Disable Power	$P_{TD}$	---	---	-30	dBm
Spectral Width (rms)	$\Delta\lambda$	---	---	0.65	nm
TX Disable Voltage – High	$V_{DH}$	2.4	---	$V_{CC}$	V
TX Disable Voltage - Low	$V_{DL}$	0	---	0.5	V
TX Fault Output - High	$V_{FH}$	2.4	---	$V_{CC}$	V
TX Fault Output - Low	$V_{FL}$	0	---	0.5	V
TX Disable Assert Time	$T_{ass}$	---	---	10	$\mu$ s
TX Disable Deassert Time	$T_{disass}$	---	---	1.0	ms
Time to Initialize	$T_{as}$	---	---	300	ms
TX Fault from Fault to Assertion	$T_{fault}$	---	---	100	$\mu$ s
TX Disable Time to Start Reset	$T_{reset}$	10	---	---	$\mu$ s

Notes:

1. Applied to AC LVPECL I/O coupling. See the design guide for proper termination.
2. Single ended will be 50 ohm for each signal line.
3. Output of coupling optical power into OM2 50/125  $\mu$ m MMF.
4. Optical eye diagram is compliant with IEEE 802.3z and 1x/2x/4X/8X FC standards.

Class 1 Laser Product  
Complies with  
21 CFR 1040.10 and 1040.11



### Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Impedance	$Z$	---	100	---	Ohm
Differential Output Voltage <sup>1</sup>	$\Delta V_o$	0.4	---	0.8	V
Operating Wavelength	$\lambda_c$	840	---	860	nm
Receiver Overload	$P_{max}$	-1	---	---	dBm
Receiver Sensitivity <sup>2</sup> (@8.5 Gb/s)	$P_I$	---	---	-11.1	dBm
Receiver Sensitivity (@4.25 Gb/s)	$P_I$	---	---	-13.1	dBm
Receiver Sensitivity (@2.125 Gb/s)	$P_I$	---	---	-15.1	dBm
Receiver Sensitivity (@1.0 Gb/s)	$P_I$	---	---	-17.1	dBm
Optical Return Loss	$OL$	12	---	---	dB
RX Signal Loss – Deasserted	$P_{RL-}$	-30	---	---	dBm
RX Signal Loss – Asserted	$P_{RL+}$	---	---	-14	dBm
Signal Detect Hysteresis	$P_{RL+} - P_{RL-}$	1.0	---	---	dB
RX Signal Loss Assert Time	$T_{RL+}$	---	---	100	$\mu$ s
RX Signal Loss Deassert Time	$T_{RL-}$	---	---	100	$\mu$ s
RX Signal Loss Output - High	$V_{RL+}$	2.4	---	$V_{CC}$	V
RX Signal Loss Output - Low	$V_{RL-}$	0	---	0.5	V

Notes:

1. Applied to AC LVPECL I/O coupling. See the design guide for proper termination.
2. Test at 8.5 Gb/s, 2<sup>7</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



# Multi-Rate 1 – 8.5 Gb/s 1310 nm Single Mode, 10 km SFP+ Dual LC Connector



## Description

OptixCom's multi-rate fiber optics transceiver is designed for 1X, 2X, 4X, 8X FC, GbE, and OC48 applications with data rate up to 8.5 Gb/s. This single mode fiber optics transceiver is designed with high performance 1310 nm light source. Dual LC connectors are used as standard interface and the package is compliant with Small Form Pluggable Plus (SFP+) specifications. The optical connector interface is dual LC.

The module is compliant with SFP+ Multi-Source Agreement (MSA). The transceiver reaches more than 50 meters of transmission distance with high-grade multimode fibers and >5 dB of power budget. The products are RoHS compliant.



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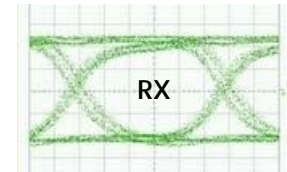
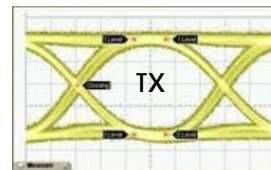
SFP-8500LX-AT10K



## Key Features

- 1310 nm single mode,
- Multi-rate from 1 to 8.5 Gb/s
- > 5 dB power budget, 10 km reach
- Duplex LC connector optical interface
- Z-axis hot pluggable
- SFF-8472 MSA Compliant
- AC coupling LVPECL differential I/O logics
- Single 3.3 V power supply
- TTL or PECL signal detect to monitor optical signals
- RoHS compliant

8.5 Gb/s, 2<sup>7</sup>-1 NRZ Data Eye Pattern



## Applications

- ✓ Fiber Channel, Gigabit Ethernet
- ✓ High speed I/O for file server
- ✓ Video over fiber links
- ✓ Media converter
- ✓ Data Communication for SAN and LAN
- ✓ Industrial Control Link
- ✓ Central offices routers and switches
- ✓ Mass storage systems interconnect

## Ordering Information

**Part Number:** SFP-8500LX-AT10K

### Description:

1310 nm, 1 to 8.5 Gb/s, single mode, SFP+ fiber optics transceiver, 10 km reach, 0-70°C

## Operating Conditions

Parameter	Min.	Typical	Max.	Units
Operate Temperature	0	25	70	°C
Data Rate	1	---	8.5	Gb/s
Supply Voltage	3.1	3.3	3.5	V
Supply Current	---	350	400	mA

### Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	$T_{st}$	-40	85	°C
Supply Voltage	$V_{CC}$	-0.5	4.0	V
Input Voltage	$V_{IN}$	-0.5	$V_{CC}$	V
Operating Current	$I_{op}$	---	450	mA
Output Current	$I_o$	---	50	mA
Soldering Temperature (10 sec. on leads)	$T_{sd}$	---	260	°C

### Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Voltage <sup>1</sup>	$\Delta V_i$	0.2	---	0.9	V
Differential Input Impedance <sup>2</sup>	$Z$	---	100	---	ohm
Optical Output Power <sup>3</sup>	$P_o$	-9	---	-1	dBm
Optical Wavelength	$\lambda_o$	1284	1310	1345	nm
Relative Intensity Noise	$RIN$	---	---	-128	dB/Hz
Extinction Ratio	$ET$	4	---	---	dB
TX Disable Power	$P_{TD}$	---	---	-30	dBm
Spectral Width (rms)	$\Delta\lambda$	---	---	1	nm
TX Disable Voltage – High	$V_{DH}$	2.4	---	$V_{CC}$	V
TX Disable Voltage - Low	$V_{DL}$	0	---	0.5	V
TX Fault Output - High	$V_{FH}$	2.4	---	$V_{CC}$	V
TX Fault Output - Low	$V_{FL}$	0	---	0.5	V
TX Disable Assert Time	$T_{ass}$	---	---	10	μs
TX Disable Deassert Time	$T_{disass}$	---	---	1.0	ms
Time to Initialize	$T_{as}$	---	---	300	ms
TX Fault from Fault to Assertion	$T_{fault}$	---	---	100	μs
TX Disable Time to Start Reset	$T_{reset}$	10	---	---	μs

Notes:

1. Applied to AC LVPECL I/O coupling. See the design guide for proper termination.
2. Single ended will be 50 ohm for each signal line.
3. Output of coupling optical power into OM2 9/125 μm SMF.
4. Optical eye diagram is compliant with IEEE 802.3z and 1x/2x/4X/8X FC standards.

Class 1 Laser Product  
Complies with  
21 CFR 1040.10 and 1040.11



### Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Impedance	$Z$	---	100	---	Ohm
Differential Output Voltage <sup>1</sup>	$\Delta V_o$	0.4	---	0.8	V
Operating Wavelength	$\lambda_c$	1260	1310	1360	nm
Receiver Overload	$P_{max}$	-1	---	---	dBm
Receiver Sensitivity <sup>2</sup> (@8.5 Gb/s)	$P_I$	---	---	-14.1	dBm
Receiver Sensitivity (@4.25 Gb/s)	$P_I$	---	---	-18.1	dBm
Receiver Sensitivity (@2.125 Gb/s)	$P_I$	---	---	-23	dBm
Receiver Sensitivity (@1.0 Gb/s)	$P_I$	---	---	-25	dBm
Optical Return Loss	$OL$	12	---	---	dB
RX Signal Loss – Deasserted	$P_{RL-}$	-30	---	---	dBm
RX Signal Loss – Asserted	$P_{RL+}$	---	---	-19	dBm
Signal Detect Hysteresis	$P_{RL+} - P_{RL-}$	1.0	---	---	dB
RX Signal Loss Assert Time	$T_{RL+}$	---	---	100	$\mu$ s
RX Signal Loss Deassert Time	$T_{RL-}$	---	---	100	$\mu$ s
RX Signal Loss Output - High	$V_{RL+}$	2.4	---	$V_{CC}$	V
RX Signal Loss Output - Low	$V_{RL-}$	0	---	0.5	V

Notes:

1. Applied to AC LVPECL I/O coupling. See the design guide for proper termination.
2. Test at 8.5 Gb/s, 2<sup>7</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



# Multi-Rate 1.0625 – 10 Gb/s 850 nm Multimode, 300 m SFP+ Dual LC Connector



## Description

OptixCom's multi-rate fiber optics transceiver is designed for 1X, 2X, 4X, 8X, 10X FC, 10 GbE, and OC48 applications with data rate up to 10 Gb/s. This multimode fiber optics transceiver is designed with high performance 850 nm VCSEL light source. Dual LC connectors are used as standard interface and the package is compliant with Small Form Pluggable Plus (SFP+) specifications. The optical connector interface is dual LC.

The module is compliant with SFP+ Multi-Source Agreement (MSA). The transceiver reaches more than 300 meters of transmission distance with high-grade multimode fibers and >5 dB of power budget. The products are RoHS compliant.



SFP-10000SX-AT300M



## Key Features

- 850 nm multimode,
- Multi-rate from 1.0625 to 10 Gb/s
- > 5 dB power budget, 300 m reach
- Duplex LC connector optical interface
- Z-axis hot pluggable
- SFF-8472 MSA Compliant
- AC coupling LVPECL differential I/O logics
- Single 3.3 V power supply
- TTL or PECL signal detect to monitor optical signals
- RoHS compliant

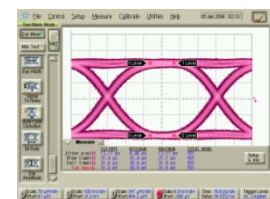
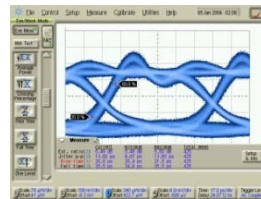
## Applications

- ✓ 10G Fiber Channel, 10 Gigabit Ethernet
- ✓ High speed I/O for file server
- ✓ Video over fiber links
- ✓ Media converter
- ✓ Data Communication for SAN and LAN
- ✓ Industrial Control Link
- ✓ Central offices routers and switches
- ✓ Mass storage systems interconnect

10 Gb/s, 2<sup>23</sup>-1 NRZ data eye pattern

TX

RX



## Ordering Information

**Part Number:** SFP-10000SX-AT300M

### Description:

850 nm, 1 to 10 Gb/s, multimode, SFP+ fiber optics transceiver, 300 m reach, 0-70°C

## Operating Conditions

Parameter	Min.	Typical	Max.	Units
Operate Temperature	0	25	70	°C
Data Rate	1	---	10	Gb/s
Supply Voltage	3.1	3.3	3.5	V
Supply Current	---	200	250	mA

### Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	$T_{st}$	-40	85	°C
Supply Voltage	$V_{CC}$	-0.5	4.0	V
Input Voltage	$V_{IN}$	-0.5	$V_{CC}$	V
Operating Current	$I_{op}$	---	300	mA
Output Current	$I_o$	---	50	mA
Soldering Temperature (10 sec. on leads)	$T_{sd}$	---	260	°C

### Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Voltage <sup>1</sup>	$\Delta V_i$	0.4	---	1.2	V
Differential Input Impedance <sup>2</sup>	$Z$	---	100	---	ohm
Optical Output Power <sup>3</sup>	$P_o$	-6.5	---	-1	dBm
Optical Wavelength	$\lambda_o$	840	850	860	nm
Relative Intensity Noise	$RIN$	---	---	-128	dB/Hz
Extinction Ratio	$ET$	4	---	---	dB
TX Disable Power	$P_{TD}$	---	---	-30	dBm
Spectral Width (-20dB)	$\Delta\lambda$	---	---	0.45	nm
TX Disable Voltage – High	$V_{DH}$	2.4	---	$V_{CC}$	V
TX Disable Voltage - Low	$V_{DL}$	0	---	0.5	V
TX Fault Output - High	$V_{FH}$	2.4	---	$V_{CC}$	V
TX Fault Output - Low	$V_{FL}$	0	---	0.5	V
TX Disable Assert Time	$T_{ass}$	---	---	10	μs
TX Disable Deassert Time	$T_{disass}$	---	---	1.0	ms
Time to Initialize	$T_{as}$	---	---	300	ms
TX Fault from Fault to Assertion	$T_{fault}$	---	---	100	μs
TX Disable Time to Start Reset	$T_{reset}$	10	---	---	μs

Notes:

1. Applied to AC LVPECL I/O coupling. See the design guide for proper termination.
2. Single ended will be 50 ohm for each signal line.
3. Output of coupling optical power into OM2 50/125 μm MMF.
4. Optical eye diagram is compliant with IEEE 802.3z and 1x/2x/4X/10X FC standards.

Class 1 Laser Product  
Complies with  
21 CFR 1040.10 and 1040.11



### Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Impedance	Z	---	100	---	Ohm
Differential Output Voltage <sup>1</sup>	$\Delta V_o$	0.3	---	0.9	V
Operating Wavelength	$\lambda_c$	840	---	860	nm
Receiver Overload	$P_{max}$	-1	---	---	dBm
Receiver Sensitivity <sup>2</sup>	$P_I$	---	---	-11.1	dBm
Receiver Sensitivity (OMA) <sup>2</sup>	$P_I$	---	---	-7.5	dBm
Optical Return Loss	OL	12	---	---	dB
RX Signal Loss – Deasserted	$P_{RL-}$	-30	---	---	dBm
RX Signal Loss – Asserted	$P_{RL+}$	---	---	-12	dBm
Signal Detect Hysteresis	$P_{RL+} - P_{RL-}$	1.0	---	---	dB
RX Signal Loss Assert Time	$T_{RL+}$	---	---	100	$\mu$ s
RX Signal Loss Deassert Time	$T_{RL-}$	---	---	100	$\mu$ s
RX Signal Loss Output - High	$V_{RL+}$	2.4	---	$V_{cc}$	V
RX Signal Loss Output - Low	$V_{RL-}$	0	---	0.5	V

Notes:

1. Applied to AC LVPECL I/O coupling. See the design guide for proper termination.
2. Test at 10 Gb/s, 2<sup>23</sup> – 1 PRBS data pattern, and > 1x10<sup>-12</sup> of Bit-Error-Rate (BER)

### Typical Transmission Distance for Multimode Fibers @ 850 nm

Data Rate	Fiber Type	Distance (m)	Data Rate	Fiber Type	Distance (m)
1.25 Gb/s	50 $\mu$ m, 500 MHz*km	550	10 Gb/s	50 $\mu$ m, 2000 MHz*km	300
	50 $\mu$ m, 400 MHz*km	500		50 $\mu$ m, 500 MHz*km	82
	62.5 $\mu$ m, 200 MHz*km	275		62.5 $\mu$ m, 200 MHz*km	33
	62.5 $\mu$ m, 160 MHz*km	220		62.5 $\mu$ m, 160 MHz*km	26

Class 1 Laser Product  
Complies with  
21 CFR 1040.10 and 1040.11





**10 Gb/s, 1310 nm  
Single mode, 2-20 km  
SFP+ Dual LC Connector**



**Description**

OptixCom's 10 Gb/s SFP+ fiber optics transceiver is designed with advanced 1310 nm FP laser and high speed electronics to achieve the optimum performance for optical interconnect applications. It is compliant with 10G Ethernet and Fiber Channel for the datacom and SONET/SDH for telecom applications. The optical connector interface is dual LC.

The module is compliant with SFP+ Multi-Source Agreement (MSA). The transceiver has > 6 dB power budget for 2-10 km of transmission distance with standard single mode fibers. The product is RoHS compliant. Total power consumption is < 2W.



**SFP-10000LX-ATXXK**  
(XX = 2, 10, 20)



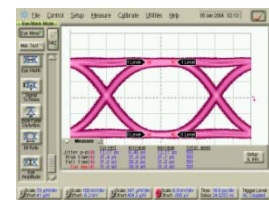
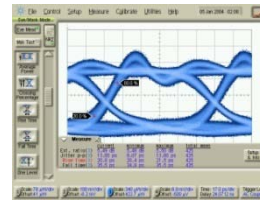
**Key Features**

- 1310 nm single mode, 2-10 km, 10 Gb/s
- > 6 dB power budget for 2-10 km
- > 12 dB power budget for 20 km
- Duplex LC connector optical interface
- Z-axis hot pluggable
- AC coupling LVPECL differential I/O logics
- SFF-8472 MSA Compliant
- TTL Signal detect to monitor optical signals
- Single 3.3 V power supply
- RoHS compliant

**Applications**

- ✓ Fiber Channel 1X, 2X, 4X, 8X, and 10X
- ✓ IEEE 802.3z 10 Gigabit Ethernet
- ✓ High speed I/O for file server
- ✓ Video over fiber links
- ✓ Data Communication for SAN and LAN
- ✓ Central offices routers and switches
- ✓ Mass storage systems interconnect

10 Gb/s, 2<sup>23</sup>-1 NRZ data eye pattern  
TX RX



**Ordering Information**

**Part Number:** SFP-10000LX-ATXXK

**Description:**

1310 nm ,10 Gb/s, single mode, SFP+ fiber optics transceiver, XXkm reach, 0 - 70°C.

XX = 2, 10, 20

**Operating Conditions**

Parameter	Min.	Typical	Max.	Units
Operate Temperature	0	25	70	°C
Data Rate	1	---	10	Gb/s
Supply Voltage	3.1	3.3	3.5	V
Supply Current	---	350	450	mA

### Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	$T_{st}$	-40	85	°C
Supply Voltage	$V_{CC}$	-0.5	4.0	V
Input Voltage	$V_{IN}$	-0.5	$V_{CC}$	V
Operating Current	$I_{op}$	---	500	mA
Output Current	$I_o$	---	50	mA
Soldering Temperature (10 sec. on leads)	$T_{sd}$	---	260	°C

### Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Voltage <sup>1</sup>	$\Delta V_i$	0.4	---	1.2	V
Differential Input Impedance <sup>2</sup>	$Z$	---	100	---	ohm
Optical Output Power <sup>3</sup>	$P_o$	-8.2	---	0.5	dBm
Optical Wavelength	$\lambda_o$	1285	1310	1345	Nm
Relative Intensity Noise	$RIN$	---	---	-128	dB/Hz
OMA	$OMA$	-5.2	---	---	dBm
TX Disable Power	$P_{TD}$	---	---	-30	dBm
Side Mode Suppression Ratio	$SMSR$	30	---	---	dB
TX Disable Voltage - High	$V_{DH}$	2.4	---	$V_{CC}$	V
TX Disable Voltage - Low	$V_{DL}$	0	---	0.5	V
TX Fault Output - High	$V_{FH}$	2.4	---	$V_{CC}$	V
TX Fault Output - Low	$V_{FL}$	0	---	0.5	V
TX Disable Assert Time	$T_{ass}$	---	---	10	μs
TX Disable Deassert Time	$T_{disass}$	---	---	1.0	ms
Time to Initialize	$T_{as}$	---	---	300	ms
TX Fault from Fault to Assertion	$T_{fault}$	---	---	100	μs
TX Disable Time to Start Reset	$T_{reset}$	10	---	---	μs

Notes:

1. Applied to AC LVPECL I/O coupling. See the design guide for proper termination.
2. Single ended will be 50 ohm for each signal line.
3. Output of coupling optical power into 9/125 μm SMF.
4. Optical eye diagram is compliant with IEEE 802.3z and 1x/2x/4X/8X/10X FC standards.

Class 1 Laser Product  
Complies with  
21 CFR 1040.10 and 1040.11



### Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Impedance	$Z$	---	100	---	Ohm
Differential Output Voltage <sup>1</sup>	$\Delta V_o$	0.3	---	0.9	V
Operating Wavelength	$\lambda_c$	1260	---	1600	nm
Receiver Overload	$P_{max}$	0.5	---	---	dBm
Receiver Sensitivity <sup>2</sup> (@10 Gb/s)	$P_I$	---	---	-14.4	dBm
Receiver Sensitivity <sup>2</sup> (OMA)	$P_I$	---	---	-12.6	dBm
Stressed Receiver Sensitivity <sup>2</sup> (OMA)	$P_I$	---	---	-10.3	dBm
Optical Return Loss	$OL$	12	---	---	dB
RX Signal Loss – Deasserted	$P_{RL-}$	-30	---	---	dBm
RX Signal Loss – Asserted	$P_{RL+}$	---	---	-15	dBm
Signal Detect Hysteresis	$P_{RL+} - P_{RL-}$	1.0	---	---	dB
RX Signal Loss Assert Time	$T_{RL+}$	---	---	100	$\mu$ s
RX Signal Loss Deassert Time	$T_{RL-}$	---	---	100	$\mu$ s
RX Signal Loss Output - High	$V_{RL+}$	2.4	---	$V_{CC}$	V
RX Signal Loss Output - Low	$V_{RL-}$	0	---	0.5	V

Notes:

1. Applied to AC LVPECL I/O coupling. See the design guide for proper termination.
2. Test at 10 Gb/s, 2<sup>23</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



### Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Optical Output Power <sup>1</sup>	$P_o$	-8.2	---	+0.5	dBm
Optical Modulation Amplitude (OMA)	$P_o$	-5.2	---	---	dBm
Optical Wavelength	$\lambda_o$	1285	1310	1345	Nm
Extinction Ratio	$ET$	8.2	---	---	dB

### Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Operating Wavelength	$\lambda_c$	1270	---	1600	nm
Receiver Overload	$P_{max}$	0.5	---	---	dBm
Receiver Sensitivity <sup>2</sup>	$P_i$	---	---	-14.4	dBm
Receiver Sensitivity in OMA	$P_{iOMA}$	---	---	-12.6	dBm
Stressed Receiver Sensitivity in OMA	$P_{iS}$	---	---	-10.3	dBm
Dispersion Penalty		---	---	2	dB
Signal Detect- Deasserted	$P_{SD-}$	-25	---	---	dBm
Signal Detect- Asserted	$P_{SD+}$	---	---	-15	dBm

Notes:

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

Class 1 Laser Product  
Complies with  
21 CFR 1040.10 and 1040.11



### Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Optical Output Power <sup>1</sup>	$P_o$	-8.2	---	+0.5	dBm
Optical Modulation Amplitude (OMA)	$P_o$	-5.2	---	---	dBm
Optical Wavelength	$\lambda_o$	1285	1310	1345	Nm
Extinction Ratio	$ET$	8.2	---	---	dB

### Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Operating Wavelength	$\lambda_c$	1270	---	1600	nm
Receiver Overload	$P_{max}$	0.5	---	---	dBm
Receiver Sensitivity <sup>2</sup>	$P_i$	---	---	-14.4	dBm
Receiver Sensitivity in OMA	$P_{iOMA}$	---	---	-12.6	dBm
Stressed Receiver Sensitivity in OMA	$P_{iS}$	---	---	-10.3	dBm
Dispersion Penalty		---	---	2	dB
Signal Detect- Deasserted	$P_{SD-}$	-25	---	---	dBm
Signal Detect- Asserted	$P_{SD+}$	---	---	-15	dBm

Notes:

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

Class 1 Laser Product  
Complies with  
21 CFR 1040.10 and 1040.11



### Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Optical Output Power <sup>1</sup>	$P_o$	-3	---	+3	dBm
Optical Modulation Amplitude (OMA)	$P_o$	-2.1	---	---	dBm
Optical Wavelength	$\lambda_o$	1285	1310	1345	Nm
Extinction Ratio	$ET$	8.2	---	---	dB

### Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Operating Wavelength	$\lambda_c$	1270	---	1600	nm
Receiver Overload	$P_{max}$	-1	---	---	dBm
Receiver Sensitivity <sup>2</sup>	$P_i$	---	---	-15	dBm
Receiver Sensitivity in OMA	$P_{iOMA}$	---	---	-14.1	dBm
Stressed Receiver Sensitivity in OMA	$P_{iS}$	---	---	-11.3	dBm
Dispersion Penalty		---	---	2	dB
Signal Detect- Deasserted	$P_{SD-}$	-25	---	---	dBm
Signal Detect- Asserted	$P_{SD+}$	---	---	-18	dBm

Notes:

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

Class 1 Laser Product  
Complies with  
21 CFR 1040.10 and 1040.11



**10 Gb/s, 1550 nm  
Single mode, 40 - 80 km  
SFP+ Dual LC Connector**



**Description**

OptixCom's 10 Gb/s SFP+ fiber optics transceiver is designed with advanced 1550 nm DFB laser and high speed electronics to achieve the optimum performance for optical interconnect applications. It is compliant with 10G Ethernet and Fiber Channel for datacom applications and SONET/SDH for telecom applications. The optical connector interface is dual LC.

The module is compliant with SFP+ Multi-Source Agreement (MSA). 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.



**SFP-10000EX-ATXXK**  
(XX = 40, 80)



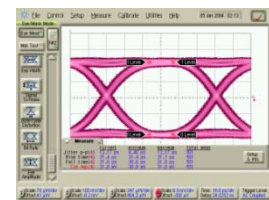
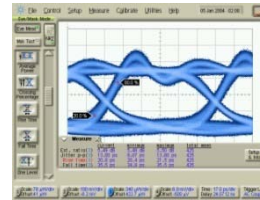
**Key Features**

- 1550 nm single mode, 40 - 80 km, 10 Gb/s
- > 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-8472 MSA Compliant
- TTL Signal detect to monitor optical signals
- Single 3.3 V power supply
- RoHS compliant

10 Gb/s, 2<sup>23</sup>-1 NRZ data eye pattern

**TX**

**RX**



**Ordering Information**

**Part Number:** SFP-10000EX-ATXXK

**Description:**

1550 nm, 10 Gb/s, single mode, SFP+ fiber optics transceiver, XX km reach, -5 - 70°C.

XX = 40, 80.

**Applications**

- ✓ Fiber Channel 1X, 2X, 4X, 8X, and 10X
- ✓ IEEE 802.3z 10 Gigabit Ethernet
- ✓ High speed I/O for file server
- ✓ Data Communication for SAN and LAN
- ✓ Central offices routers and switches
- ✓ Mass storage systems interconnect

**Operating Conditions**

Parameter	Min.	Typical	Max.	Units
Operate Temperature	-5	25	70	°C
Data Rate	1	---	10	Gb/s
Supply Voltage	3.1	3.3	3.5	V
Supply Current (40km)	---	360	450	mA
Supply Current (80km)	---	420	620	mA

### Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	$T_{st}$	-40	85	°C
Supply Voltage	$V_{CC}$	-0.5	4.0	V
Input Voltage	$V_{IN}$	-0.5	$V_{CC}$	V
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
Transmitter & Dispersion Penalty	$TDP$	---	---	3.0	dB
Side Mode Suppression Ratio	$SMSR$	30	---	---	dB
Relative Intensity Noise	$RIN$	---	---	-130	dB/Hz
TX Disable Asserted	$P_{OFF}$	---	---	-30	dBm
TX Disable Voltage - High	$V_{DH}$	2.4	---	$V_{CC}$	V
TX Disable Voltage - Low	$V_{DL}$	0	---	0.5	V
TX Disable Assert Time	$T_{ass}$	---	---	10	μs
TX Disable Deassert Time	$T_{disass}$	---	---	2	ms
Time to Initialize	$T_{ini}$	---	---	300	ms
TX Fault from Fault to Assertion	$T_{fault}$	---	---	100	μs
TX Disable Time to Start Reset	$T_{reset}$	10	---	---	μs

Notes:

1. Module is designed for AC coupling. DC voltage will be filtered by internal capacitors.
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
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:

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

Class 1 Laser Product  
Complies with  
21 CFR 1040.10 and 1040.11



### Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Optical Output Power <sup>1</sup>	$P_o$	0	---	+3	dBm
Optical Modulation Amplitude (OMA)	$P_o$	-2.1	---	---	dBm
Optical Wavelength	$\lambda_o$	1530	1550	1565	nm
Extinction Ratio	$ET$	8.2	---	---	dB

### Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Operating Wavelength	$\lambda_c$	1270	---	1600	nm
Receiver Overload	$P_{max}$	-1	---	---	dBm
Receiver Sensitivity <sup>2</sup>	$P_i$	---	---	-15	dBm
Receiver Sensitivity in OMA	$P_{iOMA}$	---	---	-14.1	dBm
Stressed Receiver Sensitivity in OMA	$P_{iS}$	---	---	-11.3	dBm
Dispersion Penalty		---	---	2	dB
Signal Detect- Deasserted	$P_{SD-}$	-25	---	---	dBm
Signal Detect- Asserted	$P_{SD+}$	---	---	-18	dBm

Notes:

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

Class 1 Laser Product  
Complies with  
21 CFR 1040.10 and 1040.11



### Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Optical Output Power <sup>1</sup>	$P_o$	0	---	+4	dBm
Optical Modulation Amplitude (OMA)	$P_o$	-2.1	---	---	dBm
Optical Wavelength	$\lambda_o$	1530	1550	1565	nm
Extinction Ratio	$ET$	8.2	---	---	dB

### Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Operating Wavelength	$\lambda_c$	1270	---	1600	nm
Receiver Overload	$P_{max}$	-8	---	---	dBm
Receiver Sensitivity <sup>2</sup>	$P_i$	---	---	-23	dBm
Receiver Sensitivity in OMA	$P_{iOMA}$	---	---	-22.1	dBm
Dispersion Penalty		---	---	3	dB
Signal Detect- Deasserted	$P_{SD-}$	-34	---	---	dBm
Signal Detect- Asserted	$P_{SD+}$	---	---	-24	dBm

Notes:

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

Class 1 Laser Product  
Complies with  
21 CFR 1040.10 and 1040.11



## Description

OptixCom's CWDM SFP+ fiber optics transceiver s are designed with high performance DFB laser and cover the wavelength spectrum from 1270 nm to 1330 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 > 8 dB power budget for 10 km of transmission distance with standard single mode fibers. The product is RoHS compliant. Total power consumption is < 2.5 W.



Lead-Free

SFP-10000CLX-AT10K-XX



## Key Features

- 1270 - 1330 nm single mode, 10 Gb/s data rate
- > 8 dB power budget for 10 km
- Duplex LC connector optical interface
- Z-axis hot pluggable
- AC coupling LVPECL differential I/O logics
- SFF-8472 MSA 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-10000CLX-AT10K-XX

### Description:

CWDM, 1270 - 1330 nm, 10 Gb/s, single mode, SFP+ fiber optics transceiver, 10 km, 1XX nm wavelength, 0-70°C

XX specifies the wavelength described below. For example, SFP-10000CLX-AT10K-27 is the 1270 nm module.

<u>XX</u>	Wavelength	<u>XX</u>	Wavelength
27	1270 nm	31	1310 nm
29	1290 nm	33	1330 nm

## 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	---	---	750	mA

### Absolute Maximum Ratings

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

### Transmitter Electro-Optical 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
Optical Output Power <sup>3</sup>	$P_o$	-6.5	---	+0.5	dBm
Center Wavelength – 1270 nm	$\lambda_c$	1264.5	1270	1277.5	nm
Center Wavelength – 1290 nm	$\lambda_c$	1284.5	1290	1297.5	nm
Center Wavelength – 1310 nm	$\lambda_c$	1304.5	1310	1317.5	nm
Center Wavelength – 1330 nm	$\lambda_c$	1324.5	1330	1337.5	nm
Side Mode Suppression Ratio	$SMSR$	30	---	---	dB
Extinction Ratio	$ET$	6	---	---	dB
Rise/Fall Time (20% - 80%)	$T_r/T_f$	---	---	40	ps
Relative Intensity Noise	$RIN$	---	---	-130	dB/Hz
TX Disable Asserted	$P_{OFF}$	---	---	-30	dBm
TX Disable Voltage – High	$V_{DH}$	2.4	---	$V_{CC}$	V
TX Disable Voltage – Low	$V_{DL}$	0	---	0.5	V
TX Disable Assert Time	$T_{ass}$	---	---	10	μs
TX Disable Deassert Time	$T_{disass}$	---	---	2	ms
Time to Initialize	$T_{ini}$	---	---	300	ms
TX Fault from Fault to Assertion	$T_{fault}$	---	---	100	μs
TX Disable Time to Start Reset	$T_{reset}$	10	---	---	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. Output of average coupling optical power into 9/125 μm SMF.

### Receiver Electro-Optical 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
Operating Wavelength	$\lambda_c$	1270	---	1600	nm
Receiver Overload	$P_{max}$	+0.5	---	---	dBm
Receiver Sensitivity <sup>2</sup>	P <sub>I</sub>	---	-16	-14.5	dBm
Receiver Sensitivity in OMA	P <sub>IOMA</sub>	---	---	-12.5	dBm
Rise/Fall Time (20% - 80%)	T <sub>r</sub> /T <sub>f</sub>	---	---	40	ps
Signal Detect- Deasserted	P <sub>SD-</sub>	-25	---	---	dBm
Signal Detect- Asserted	P <sub>SD+</sub>	---	---	-15	dBm
Dispersion Penalty		---	---	4	dB
RX Signal Loss Output - High	V <sub>RL+</sub>	2.4	---	V <sub>CC</sub>	V
RX Signal Loss Output - Low	V <sub>RL-</sub>	0	---	0.8	V
RX Signal Loss Assert Time	T <sub>RL+</sub>	---	---	100	μs
RX Signal Loss Deassert Time	T <sub>RL-</sub>	---	---	100	μs

Notes:

1. Single ended will be 50 ohm for each signal line.
2. 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



## Description

OptixCom's CWDM SFP+ fiber optics transceiver s 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-8472 MSA 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



**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 or 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-10000DEX-AT40K-XX  
SFP-10000DEX-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-8472 MSA 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-10000DEX-AT40K-XX

**Description:**

DWDM, 10 Gb/s, single mode, SFP+ fiber optics transceiver, 40 km, XX ITU channel code 17-61, -5 -70°C.

**Part Number:** SFP-10000DEX-AT80K-XX

**Description:**

DWDM, 10 Gb/s, single mode, SFP+ fiber optics transceiver, 80 km, XX ITU channel code 17-61, -5 -70°C

XX specifies ITU channel code associated with the wavelength. For example, SFP-10000DEX-AT40K-17 is the 1ITU-17 channel with the 1563.86 nm wavelength and 191.7 THz frequency.

**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
Supply Current (40km)	---	360	450	mA
Supply Current (80km)	---	420	620	mA

### 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 <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
Channel Spacing	$\Delta f$	---	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	$\mu$ s
TX Fault from Fault to Assertion	$T_{fault}$	---	---	100	$\mu$ s
TX Disable Time to Start Reset	$T_{reset}$	10	---	---	$\mu$ s
Time to Initialize	$T_{as}$	---	---	300	ms

### General Receiver Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Output Voltage <sup>1</sup>	$\Delta V_o$	0.4	---	0.8	V
Differential Input Impedance <sup>2</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	---	0.5	V
RX Signal Loss Assert Time	$T_{RL+}$	---	---	100	$\mu$ s
RX Signal Loss Deassert Time	$T_{RL-}$	---	---	100	$\mu$ 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 <sup>1</sup>	$P_o$	-1	---	+3	dBm
Extinction Ratio	$ET$	8.2	---	---	dB
TX Disable Asserted	$P_{OFF}$	---	---	-30	dBm
Center Wavelength (Start of Life)	$\lambda_c$	$\lambda_c - 25$	$\lambda_c$	$\lambda_c + 25$	pm
Center Wavelength (End of Life)	$\lambda_c$	$\lambda_c - 100$	$\lambda_c$	$\lambda_c + 100$	pm

### Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Operating Wavelength	$\lambda_c$	1528	---	1564	nm
Receiver Overload	$P_{max}$	--	---	-1	dBm
Receiver Sensitivity <sup>2</sup>	$P_I$	---	---	-16	dBm
Receiver Sensitivity in OMA <sup>2</sup>	$P_I$	---	---	-14.1	dBm
RX Signal Loss – Asserted	$P_{RL+}$	---	---	-20	dBm
RX Signal Loss – Deasserted	$P_{RL-}$	-28	---	---	dBm

Notes:

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

Class 1 Laser Product  
Complies with  
21 CFR 1040.10 and 1040.11



### Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Optical Output Power <sup>1</sup>	$P_o$	-1	---	+3	dBm
Extinction Ratio	$ET$	8.2	---	---	dB
TX Disable Asserted	$P_{OFF}$	---	---	-30	dBm
Center Wavelength (Start of Life)	$\lambda_c$	$\lambda_c - 25$	$\lambda_c$	$\lambda_c + 25$	pm
Center Wavelength (End of Life)	$\lambda_c$	$\lambda_c - 100$	$\lambda_c$	$\lambda_c + 100$	pm

### Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Operating Wavelength	$\lambda_c$	1528	---	1564	nm
Receiver Overload	$P_{max}$	--	---	-7	dBm
Receiver Sensitivity <sup>2</sup>	$P_I$	---	---	-24	dBm
Receiver Sensitivity in OMA <sup>2</sup>	$P_I$	---	---	-23	dBm
RX Signal Loss – Asserted	$P_{RL+}$	---	---	-24	dBm
RX Signal Loss – Deasserted	$P_{RL-}$	-34	---	---	dBm

Notes:

1. Output of coupling optical power into 9/125  $\mu\text{m}$  SMF.
2. 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

