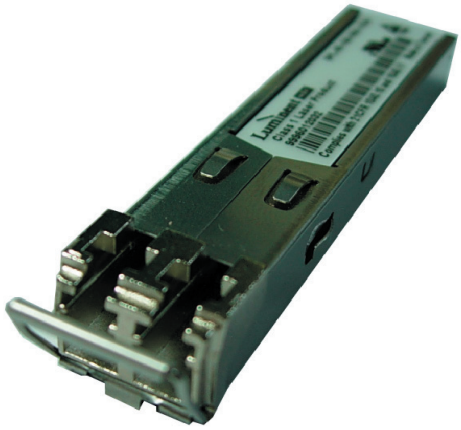
Fast Ethernet SFP Transceiver

SP-FE-LX



Features

- **Compliant with OC3/STM-1, IEEE 802.3ah, 100BASE-LX10**
- **Single 3.3 V Supply**
- **10 dB Minimum Link Budget**
- **15 km Minimum Reach**
- **1310nm FP Laser**
- **Commercial Temperature Available (-Cxx)**
- **Industrial Temperature Available (-Txx)**
- **SFP MSA SFF-8074i Compliant**
- **Telcordia GR-468 Compliant**
- **Digital Diagnostic SFF-8472 Compliant**
- **Color coded bail latch tube: Grey**
- **RoHS-5/6 compliant product (lead exemption) (-xxA)**
- **RoHS-6/6 compliant product (lead free soldering) (-xxC)**

General operating

Parameter	Symbol	Min.	Typical	Max.	Unit
Supply Voltage	V_{cc}	3.135	3.3	3.465	V
Total Current	I_{cc}	-	-	300	mA
Power Supply Noise Rejection[a]	PSR	100	-	-	mV_{p-p}
Operating Temperature (-Cxx)	T_{op}	-5	-	70	°C
Operating Temperature (-Txx)	T_{op}	-40	-	85	°C
Storage Temperature	T_{st}	-40	-	85	°C
Data Rate	DR	10	125	155	Mbps

a)20 Hz to 155 MHz

Transmitter Specifications

Parameter	Symbol	Min	Typical	Max	Unit
Optical Power	P_{OP}	-15	-11	-8	dBm
Average Launch Power Of Off Tx	P_{Off}	-	-	-45	dBm
Extinction Ratio	ER	6.6	-	-	dB
Eye Mask	IEEE 802.3ah and SONET/SDH Compliant				
Optical Rise Time[b]	t_r	-	-	2	ns
Optical Fall Time[b]	t_f	-		2	ns
Mean Wavelength	λ	1260	1310	1360	nm
Spectral Width (RMS)	Δλ	-	-	7.7	nm
Optical Return Loss Tolerance	ORLT	-	-	12	dB

b) 20%-80% values

20550 Nordhoff St. • Chatsworth, CA 91311 • tel: 818.773.9044 • fax: 818.576.9486
9F, No 81, Shui Lee Rd. • Hsinchu, Taiwan, R.O.C. • tel: 886.3.5169222 • fax: 886.3.5169213

Transmitter Specifications (Electical)

Parameter	Symbol	Min	Typical	Max	Unit
Input Differential Impedence	R_{in}	80	100	120	Ω
PECL Single Ended Data Input Swing	$V_{in,p-p}$	250	-	1200	mV
TxFault_Fault	V_{fault}	2	-	V_{cc}	V
TxFault_Normal	V_{normal}	V_{ee}	-	V_{ee}+0.5	V
TxDisable_Disable	V_d	2	-	V_{cc}	V
TxDisable_Enable	V_{en}	V_{ee}	-	V_{ee}+0.8	V

Receiver Specifications

Parameter	Symbol	Min	Typical	Max	Unit
Receive Power Low[c]	$R_{sens,low}$	-	-34	-25	dBm
Receive Power High	$R_{sens,high}$	-8	-	-	dBm
Damage Threshold For Receiver	$P_{in,damage}$	0	-	-	dBm
Wavelength[d]	λ	1260	1310	1360	nm
Los Assert		-44	-	-	dBm
Los De-assert		-	-	-25	dBm
Los Hysteresis		0.5	-	-	dB

c) 2^7-1 PRBS, BER 10^{-12}
d) Operational over 1200 to 1625 nm range

Electrical Output

Parameter	Symbol	Min	Typical	Max	Unit
PECL Single Ended Data Output Swing	$V_{out, p-p}$	185	-	800	mV
Data Output Rise Time	t_r	-	-	2	ns
Data Output Fall Time	t_f	-	-	2	ns

Timing and Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Tx Disable Negate Time	t_on	-	-	25	ms
Tx Disable Assert Time	t_off	-	-	10	µs
Time To Initialize, Including Reset Of Tx Fault	t_init	-	-	300	ms
Tx Fault Assert Time	t_fault	-	-	100	µs
Tx Disable To Reset	t_reset	10	-	-	µs
Los Assert Time	t_loss_on	-	-	300	µs
Los De-assert Time	t_loss_off	-	-	100	µs
Serial ID Clock Rate	f_serial_clock	-	-	100	KHz
RX_LOS Voltage (High)		2	-	-	V
RX_LOS Voltage (Low)		-	-	0.8	V
Los Output Voltage-Fault	V_{LOS} fault	2	-	V_{cc}	V
Los Output Voltage-Normal	V_{LOS}normal	V_{ee}	-	V_{ee}+0.5	V
MOD_DEF (0:2)-High	V_h	2	-	V_{cc}	V
MOD_DEF (0:2)-LOW	V_l	V_{ee}	-	V_{ee}+0.5	V

20550 Nordhoff St. • Chatsworth, CA 91311 • tel: 818.773.9044 • fax: 818.576.9486
9F, No 81, Shui Lee Rd. • Hsinchu, Taiwan, R.O.C. • tel: 886.3.5169222 • fax: 886.3.5169213

Digital Diagnostics

Parameter	Range	Accuracy	Unit	Calibration	Bit Value	Formula
Temperature (-CDx)	-5 to 70	±3	°C	Internal	1/256 C	Tc(C) = Tad(16 bit signed twos complement)/256
Temperature (-TDx)	-40 to 85	±3	°C	Internal	1/256 C	Tc(C) = Tad(16 bit signed twos complement)/256
Voltage	0 to Vcc	0.1	V	Internal	100µV	V(Volts) = Vad(16 bit unsigned integer)*0.1
Bias Current	0 to 120	5	mA	External	-	I(mA) = Islope * Iad(16 bit unsigned integer)+Ioffset
Tx Power	-15 to -8	±3	dBm	External	-	Tx_PWR(µW) = Tx_PWRslope*Tx_PWRad(16 bit unsigned integer)+Tx_PWRoffset
Rx Power	-25 to -8	±3	dBm	External	-	Rx_PWR(µW) = A0+A1*x+A2*x^2+A3*x^3+A4*x^4

EEPROM Serial ID

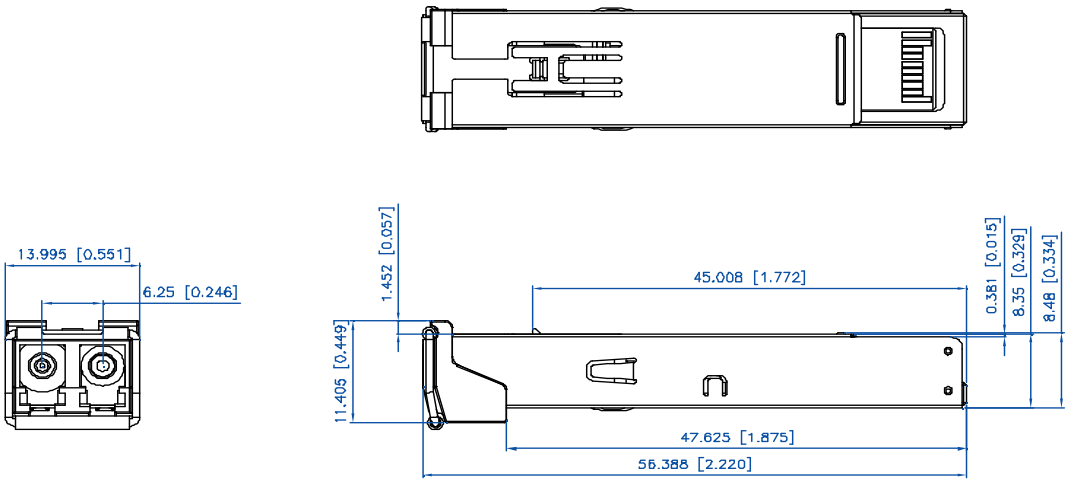
Name of Field	Description of Field	Address	Hex	ASCII
Vendor Name	SFP Vendor name(ASCII)	20	4C	L
		21	55	U
		22	4D	M
		23	49	I
		24	4E	N
		25	45	E
		26	4E	N
		27	54	T
		28	4F	O
		29	49	I
		30	43	C
Vendor OUI	IEEE vendor OUI code for LuminentOIC Inc.	37	00	
		38	06	
		39	B5	
Vendor PN	Part number in ASCII, e.g. SP-FE-LX-CDA	40	53	S
		41	50	P
		42	46	F
		43	45	E
		44	4C	L
		45	58	X
		46	43	C
		47	44	D
		48	41	A

Pinout Definitions

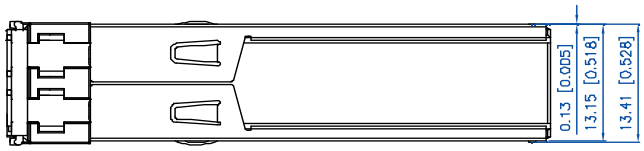
Pin	Function	Notes
1	$V_{ee}T$	TX GND
2	TX_FAULT	Open Collector
3	TX_DISABLE	Internally Pulled High
4	MOD_DEF2	Serial Data Input
5	MOD_DEF1	Serial Clock Input
6	MOD_DEF0	Internally Grounded
7	NC	Not Connected
8	LOS	Open Collector
9	$V_{ee}R$	RX Ground
10	$V_{ee}R$	RX Ground
11	$V_{ee}R$	RX Ground
12	RXD-	RX Data Negative
13	RXD+	RX Data Positive
14	$V_{ee}R$	RX GND
15	V_{ccR}	RX Power
16	V_{ccT}	TX Power
17	$V_{ee}T$	TX GND
18	TXD+	TX Data Positive
19	TXD-	TX Data Negative
20	$V_{ee}T$	TX GND

20550 Nordhoff St. • Chatsworth, CA 91311 • tel: 818.773.9044 • fax: 818.576.9486
9F, No 81, Shui Lee Rd. • Hsinchu, Taiwan, R.O.C. • tel: 886.3.5169222 • fax: 886.3.5169213

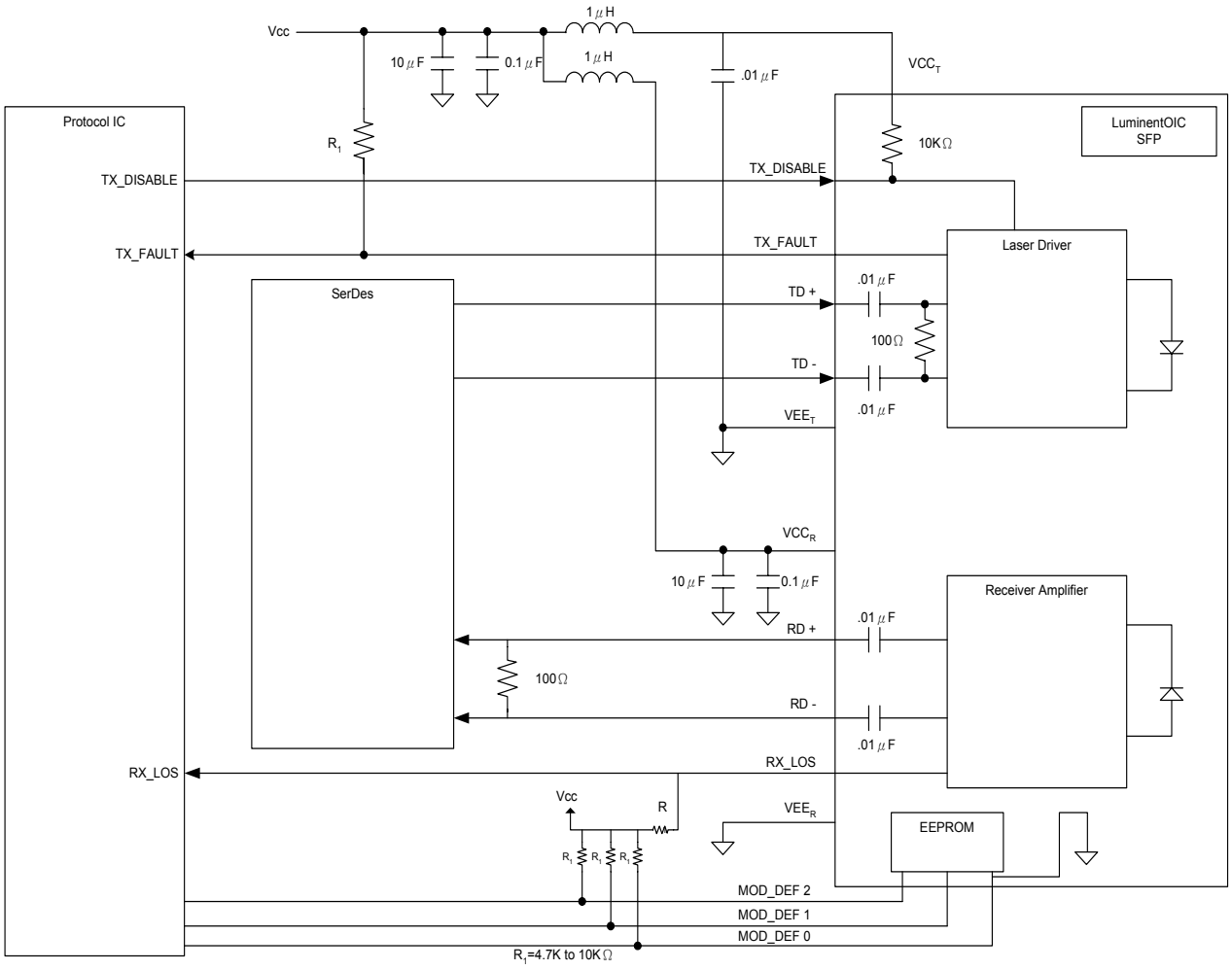
Outline drawing



Units in mm(inches)



Suggested Transceiver Interface



Ordering Information

Available Options:

SP-FE-LX-CDA	SP-FE-LX-CDC
SP-FE-LX-CNA	SP-FE-LX-CNC
SP-FE-LX-TDA	SP-FE-LX-TDC
SP-FE-LX-TNA	SP-FE-LX-TNC

Part numbering Definition:

SP - FE - LX - Temperature Diagnostic Revision

- **SP= Small Form Pluggable**
- **Data Rate**
  FE = Fast Ethernet (100 Mbps)
- **Standard**
  LX = 100BASE-LX10
- **Operating Temperature**
  C = Commercial temperature (-5 to 70°C)
  T = Industrial temperature (-40 to 85°C)
- **D = Digital diagnostic (SFF-8472)**
  N = No Digital diagnostic
- **Design Revision**
  A = RoHS-5/6 compliant product (lead exemption)
  C = RoHS-6/6 compliant product (no exemption)

Warnings:

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.
Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

Legal Notes: