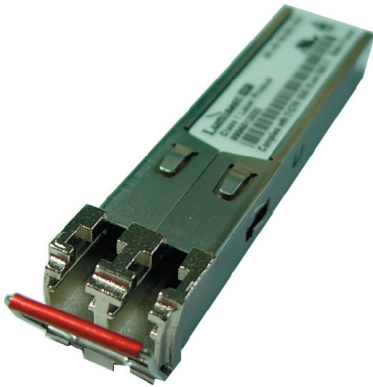


SP-12-LR1-CxA-LO



Features

- Compliant with OC12/STM-4 Standards
- Single 3.3 V supply
- 25 dB Minimum Link Budget
- 1310nm DFP Laser, 50 km reach
- Commercial Temperature Available
- SFP MSA SFF-8074i compliant
- Digital Diagnostic SFF-8472 Compliant
- Telcordia GR-468 compliant
- Color Coded Bail Latch: Red
- RoHS Compliant

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	T_{op}	-5	-	70	°C
Storage Temperature	T_{st}	-40	-	85	°C
Data Rate OC12/STM-4	DR	-	622	-	Mbps

a) 20Hz to 155MHz

Transmitter Specifications

Parameter	Symbol	Min	Typical	Max	Unit
Optical Power	P_{OP}	-3	0	+2	dBm
Average Launch Power Of Off Tx	P_{Off}	-	-	-45	dBm
Extinction Ratio	ER	8.2	-	-	dB
Eye Mask		-	-	-	SONET/SDH compliant
Optical Jitter Generation	J_{gen}	-	-	0.002	UI
Optical Rise Time ^b	t_r	-	-	500	ps
Optical Fall Time ^b	t_f	-	-	500	ps
Mean Wavelength	λ	1296	1310	1330	nm
Spectral Width (RMS)	$\Delta\lambda$	-	-	1.7	nm
Dispersion Penalty	D_p	-	0.5	1	dB
Relative Intensity Noise	RIN	-	-	-120	dB/Hz

b) 20%-80% values

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Transmitter Specifications (Electrical)

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	$R_{sens,low}$	-	-30	-28	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		-45	-	-	dBm
LOS De-assert		-	-	-28	dBm
LOS Hysteresis		0.5	-	-	dB

c) 10^{-12} at nominal wavelength

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	-	-	500	ps
Data Output Fall Time	t_f	-	-	500	ps

Timing and Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Tx Disable Negate Time	t_{on}	-	-	1	ms
Tx Disable Assert Time	t_{off}	-	-	10	μ s
Time To Initialize, Including Reset Of Tx Fault	t_{init}	-	-	300	ms
Tx Fault Assert Time	t_{fault}	-	-	100	μ s
Tx Disable To Reset	t_{reset}	10	-	-	μ s
Los Assert Time	t_{loss_on}	-	-	100	μ s
Los De-assert Time	t_{loss_off}	-	-	100	μ s
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

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Diagnostics

Parameter	Range	Accuracy	Unit	Calibration	Formula
Temperature (-CDA)	-5 to 70	±3	°C	External	$T_c(C) = T_{slope} * T_{ad}(16 \text{ bit signed twos complement value}) + T_{offset}$
Voltage	0 to V_{CC}	±0.1	V	External	$V(\text{Volts}) = V_{slope} * V_{ad}(16 \text{ bit unsigned integer}) + V_{offset}$
Bias current	0 to 120	±5	mA	External	$I(\text{mA}) = I_{slope} * I_{ad}(16 \text{ bit unsigned integer}) + I_{offset}$
TX Power	-3 to +2	±3 dB	dBm	External	$TX_PWR(\mu W) = TX_PWR_{slope} * TX_PWR_{ad}(16 \text{ bit unsigned integer}) + TX_PWR_{offset}$
RX Power	-28 to -8	±3 dB	dBm	External	$RX_PWR(\mu W) = A0 + A1 * x + A2 * x^2 + A3 * x^3 + A4 * x^4$

EEPROM Serial ID (A0h)

Name of Field	Description of Field	Address	Hex	ASCII
Identifier		0	03	
Ext. Identifier		1	04	
Connector	Code for connector type	2	07	
Transceiver		3	00	
		4	10	
		5	40	
		6	00	
		7	00	
		8	00	
		9	00	
		10	00	
Encoding		11	05	
BR.Nominal	Units of 100 Mbits/sec.	12	06	
Reserved	Reserved	13	00	
Length (9µm,km)	9/125 µm fiber, units of km	14	32	
Length (9µm)	9/125 µm fiber, units of 100 m	15	FF	
Length (50µm)	50/125 µm fiber, units of 10 m	16	00	
Length (62.5µm)	62.5/125 µm fiber, units of 10 m	17	00	
Length (Copper)	Units of meters	18	00	
Reserved		19	00	

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EEPROM Serial ID (A0h)				
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-12-LR1-CxA-LO	40	53	S
		41	50	P
		42	31	1
		43	32	2
		44	4C	L
		45	52	R
		46	31	1
		47	43	C
		48	44 or 4E	D or N
		49	41	A
		50	4C	L
		51	4F	O

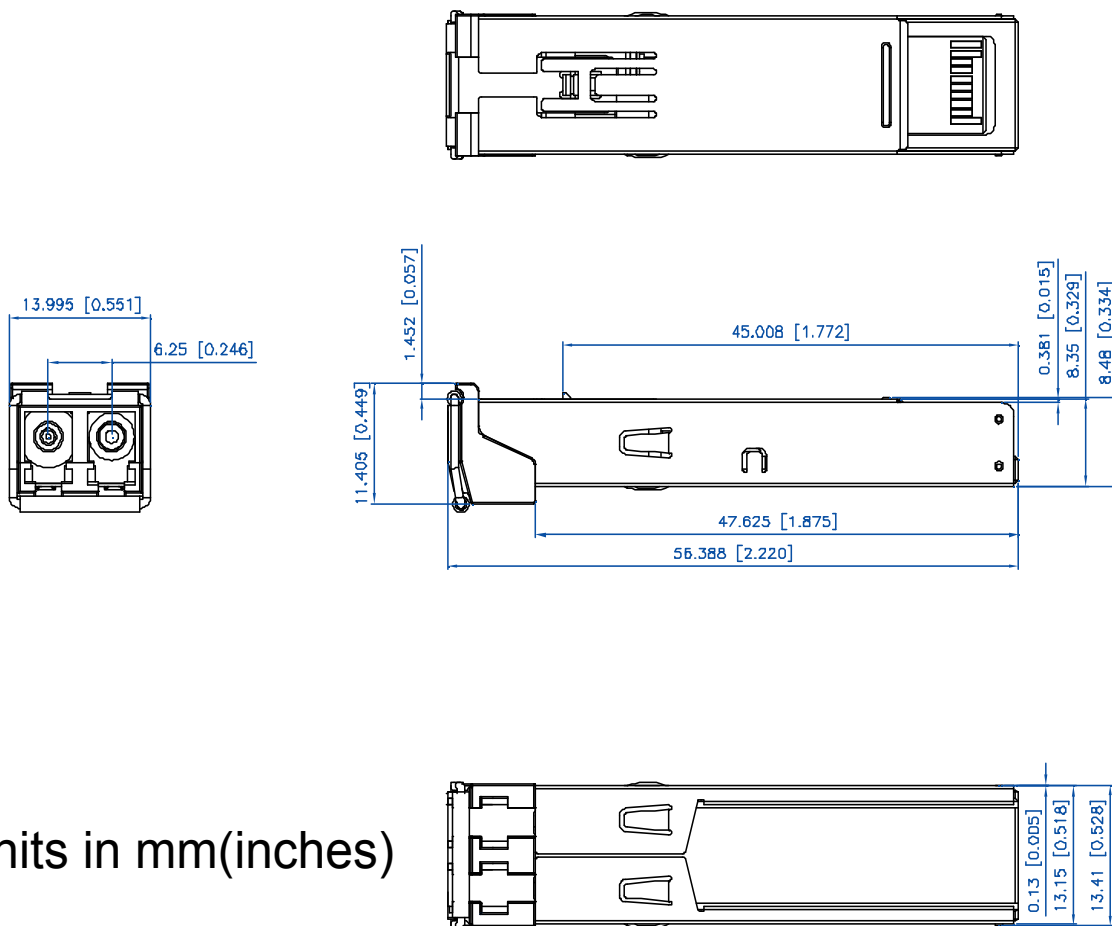
SP-12-LR1-CxA-LO

Pinout Definitions

Pin	Function	Notes
1	V _{ee} T	TX Ground
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 Ground
15	V _{cc} R	RX Power
16	V _{cc} T	TX Power
17	V _{ee} T	TX Ground
18	TXD+	TX Data Positive
19	TXD-	TX Data Negative
20	V _{ee} T	TX Ground

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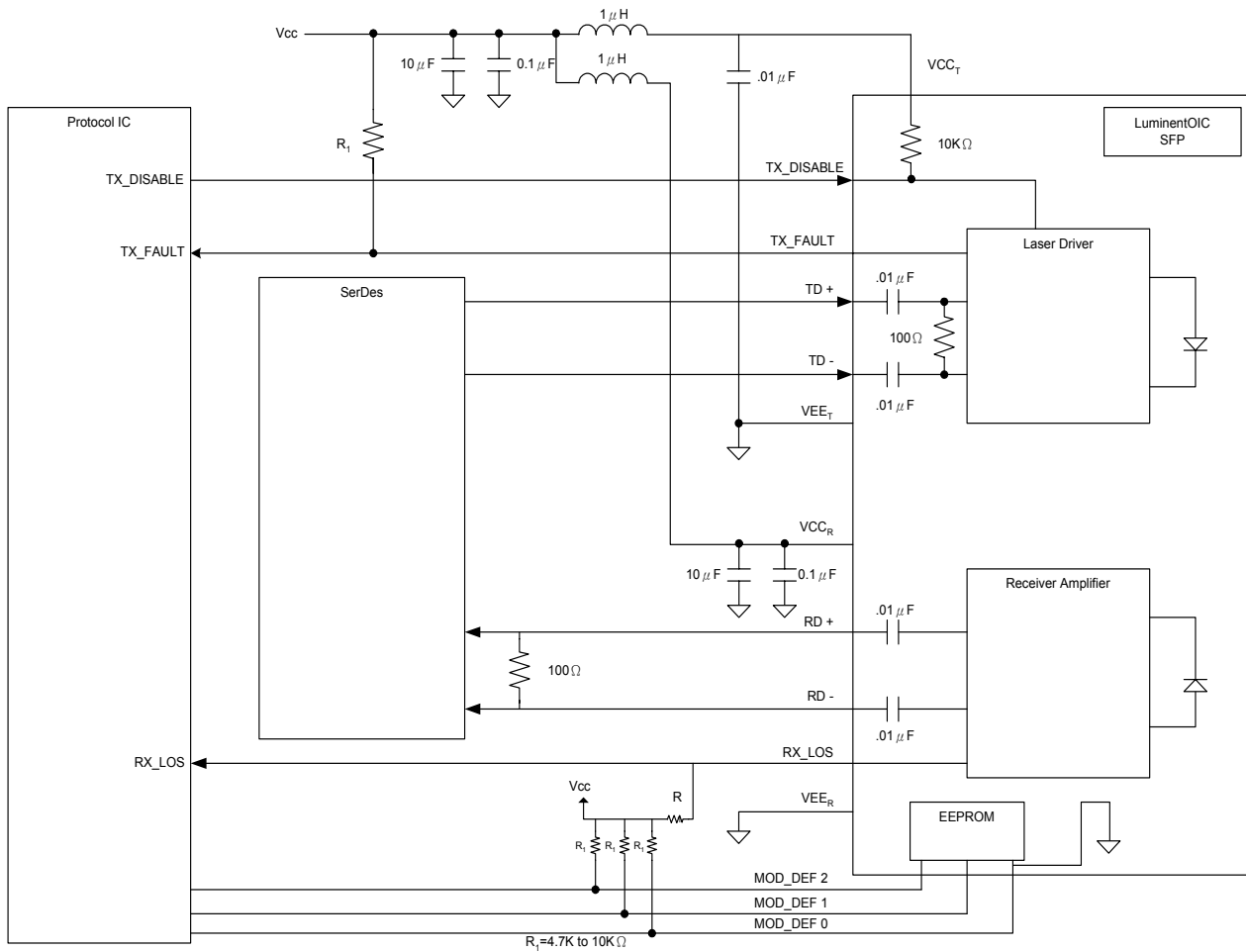
Outline drawing



Units in mm(inches)

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Suggested Transceiver Interface

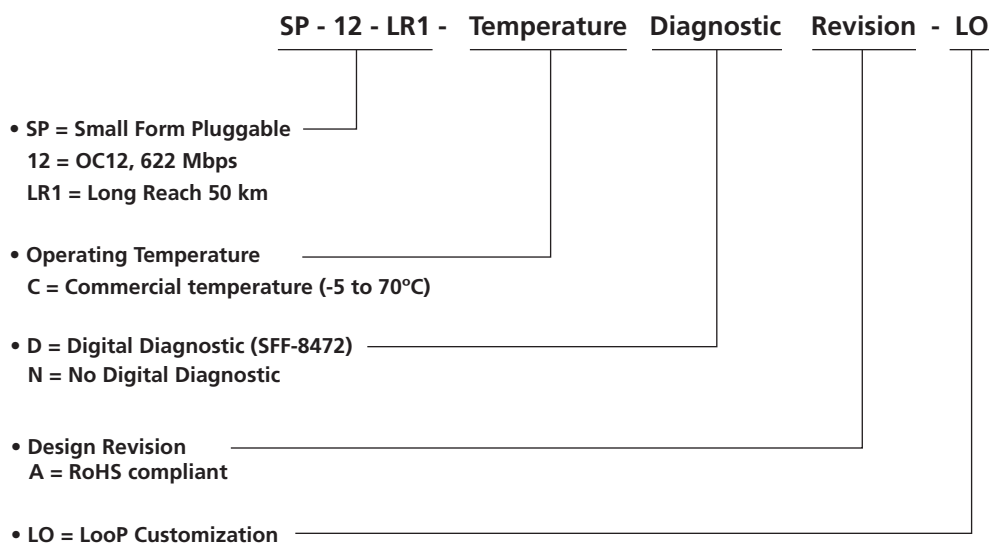


SP-12-LR1-CxA-LO

Ordering Information

Available Options:
SP-12-LR1-CNA-LO
SP-12-LR1-CDA-LO

Part numbering Definition:



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:

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