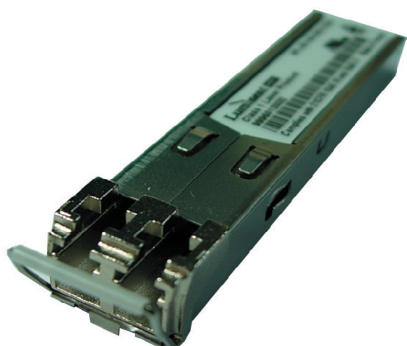


SP-12-LR2



Features

- Compliant with OC12/STM-4 Standards
- Single 3.3 V supply
- 25 dB minimum link budget
- 1550nm DFB Laser, 80 km reach
- Commercial Temperature Available (-Cxx)
- Reduced Industrial Temperature Available (-Rxx)
- Industrial Temperature Available (-Txx)
- SFP MSA SFF-8074i compliant
- Digital Diagnostic SFF-8472 Compliant
- Telcordia GR-468 compliant
- Color coded bail latch: White
- RoHS-5/6 compliant product (lead exemption)

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 (-Rxx)	T _{op}	-20	-	85	°C
Operating Temperature (-Txx)	T _{op}	-40	-	85	°C
Storage Temperature	T _{st}	-40	-	85	°C
Data Rate OC 12/STM-2	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	10	-	-	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	1480	1550	1580	nm
Spectral Width (-20dB width)	Δλ	-	-	1	nm
Side Mode Suppression Ratio	SMSR	-	-	30	dB
Dispersion Penalty (at 80 Km)		-	0.5	1	dB
Relative Intensity Noise	RIN	-	-	-120	dB/Hz

b) 20%-80% values

SP-12-LR2

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	$R_{sens,low}$	-	-30	-28	dBm
Receive Power High	$R_{sens,high}$	-8	-	-	dBm
Damage Threshold For Receiver	$P_{in,damage}$	0	-	-	dBm
Wavelength ^d	λ	1480	1550	1580	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 (-CDx)	-5 to 70	±3	°C	Internal	$Tc(C)=Tad(16 \text{ bit signed twos complement})/256$
Temperature (-RDx)	-20 to 85	±3	°C	Internal	$Tc(C)=Tad(16 \text{ bit signed twos complement})/256$
Temperature (-TDx)	-40 to 85	±3	°C	Internal	$Tc(C)=Tad(16 \text{ bit signed twos complement})/256$
Voltage	0 to V_{CC}	±0.1	V	Internal	$V(\text{Volts})=Vad(16 \text{ bit unsigned integer}) * 0.1$
Bias current	0 to 120	±5	mA	External	$I(\text{mA})=Islope * Iad(16 \text{ bit unsigned integer}) + Ioffset$
TX Power	-3 to +2	±3 dB	dBm	External	$TX_PWR(\mu W)=TX_PWRslope * TX_PWRad(16 \text{ bit unsigned integer}) + TX_PWRoffset$
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

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-LR2-CNA	40	53	S
		41	50	P
		42	31	1
		43	32	2
		44	4C	L
		45	52	R
		46	32	2
		47	43	C
		48	4E	N
		49	41	A

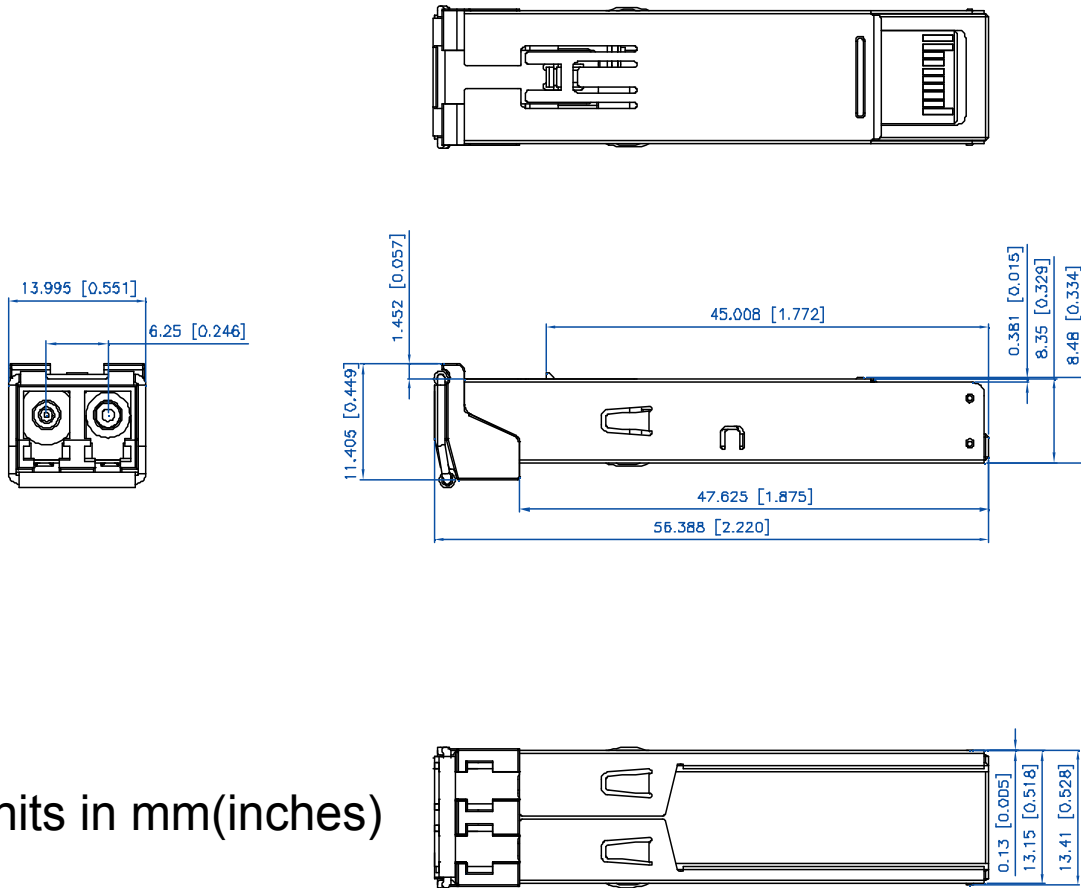
SP-12-LR2

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

SP-12-LR2

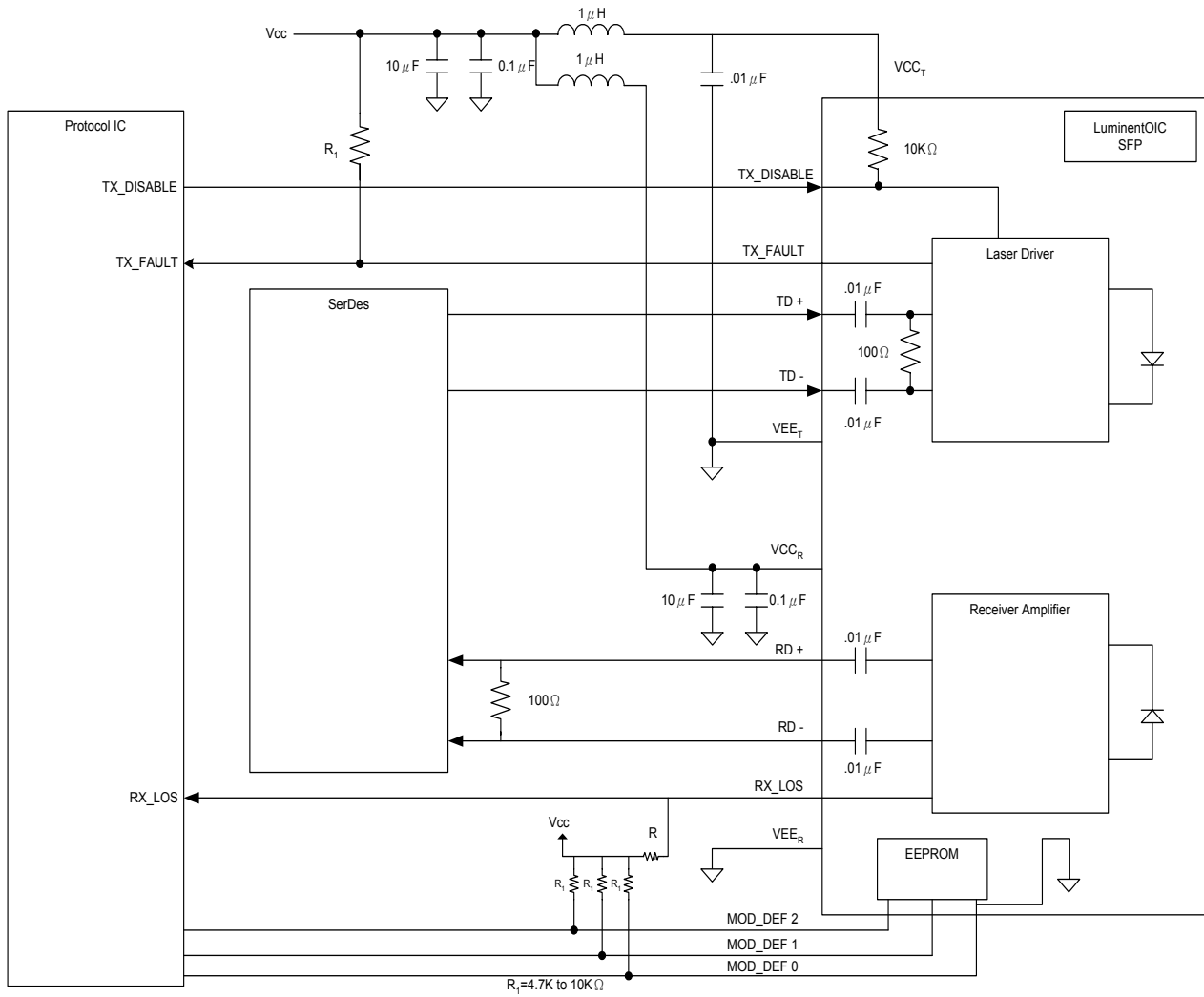
Outline drawing



Units in mm(inches)

SP-12-LR2

Suggested Transceiver Interface



SP-12-LR2

Ordering Information

Available Options:

SP-12-LR2-CNA	SP-12-LR2-CDA
SP-12-LR2-RNA	SP-12-LR2-RDA
SP-12-LR2-TNA	SP-12-LR2-TDA

Part numbering Definition:

SP - 12 - LR2 - Temperature Diagnostic Revision

- SP = Small Form Pluggable
12 = OC12, 622 Mbps
LR2 = Long Reach 80 km
- Operating Temperature
C = Commercial temperature (-5 to 70°C)
R = Reduced Industrial temperature (-20 to 85°C)
T = Industrial temperature (-20 to 85°C)
- D = Digital Diagnostic (SFF-8472)
N = No Digital Diagnostic
- Design Revision
A = RoHS-5/6 compliant product (lead 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:

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