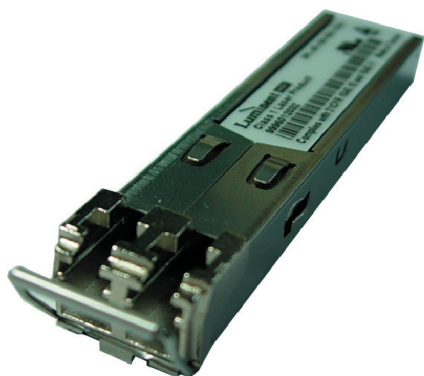


SP-03-LR1



Features

- Single 3.3V Supply
- 29dB Minimum Link Budget
- Commercial and Industrial Temperature Available
- 1310nm FP Laser
- SFP MSA SFF-8074i Compliant
- GR-253/ITU-T G.957 Compliant
- IEEE 802.3ah Fast Ethernet Compliant
- Digital Diagnostic SFF-8472 Compliant
- Telcordia GR-468 Compliant
- Color coded bail latch: Grey
- RoHS-5/6 compliant product (lead exemption) (-xxA)
- RoHS-6/6 compliant product (lead free soldering) (-xxC)

General Operation

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 OC-3/STM-1	DR	125	155	-	Mbps

a) 20Hz to 155MHz

Transmitter Specifications

Parameter	Symbol	Min	Typical	Max	Unit
Optical Power	P_{OP}	-5	-2.5	0	dBm
Average Launch Power (Tx:Off)	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	-	-	2	ns
Optical Fall Time ^b	t_f	-	-	2	ns
Mean Wavelength	λ	1263	1310	1360	nm
Spectral Width (RMS)	$\Delta\lambda$	-	-	3	nm
Dispersion Penalty (40km)		-	0.5	1	dB
Relative Intensity Noise	RIN	-	-	-120	dB/Hz
Reflectance Tolerance	rp	-24	-	-	dB

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 (Optical)

Parameter	Symbol	Min	Typical	Max	Unit
Receive Power Low ^c	$R_{sens,low}$	-	-36	-34	dBm
Receive Power High ^c	$R_{sens,high}$	-10	-	-	dBm
Damage Threshold For Receiver	$P_{in,damage}$	4	-	-	dBm
Wavelength ^d	λ	1263	1310	1360	nm
LOS Assert		-44	-	-	dBm
LOS De-Assert		-	-	-34	dBm
LOS Hysteresis		0.5	-	-	dB

c) at 10^{-10} , PRBS 2²³-1

d) Operational over 1200 to 1625nm range

Receiver Specifications (Electrical)

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	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	$t_{loss,on}$	-	-	300	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 (SP-03-LR1-XDA)

Parameter	Range	Accuracy	Unit	Calibration	Formula
Temperature (-CDx)	-5 to 70	±3	°C	Internal	$T_c(C) = T_{ad}(16 \text{ bit signed twos complement})/256$
Temperature (-TDx)	-40 to 85	±3	°C	Internal	$T_c(C) = T_{ad}(16 \text{ bit signed twos complement})/256$
Voltage	0 to V_{CC}	±0.1	V	Internal	$V(\text{Volts}) = V_{ad}(16 \text{ bit unsigned integer}) * 0.1$
Bias current	0 to 120	±5	mA	External	$I(\text{mA}) = I_{slope} * I_{ad}(16 \text{ bit unsigned integer}) + I_{offset}$
TX Power	-5 to 0	±3dB	dBm	External	$TX_PWR(\mu W) = TX_PWR_{slope} * TX_PWR_{ad}(16 \text{ bit unsigned integer}) + TX_PWR_{offset}$
RX Power	-34 to -10	±3dB	dBm	External	$RX_PWR(\mu W) = A0 + A1 * x + A2 * x^2 + A3 * x^3 + A4 * x^4$

EEPROM Serial ID

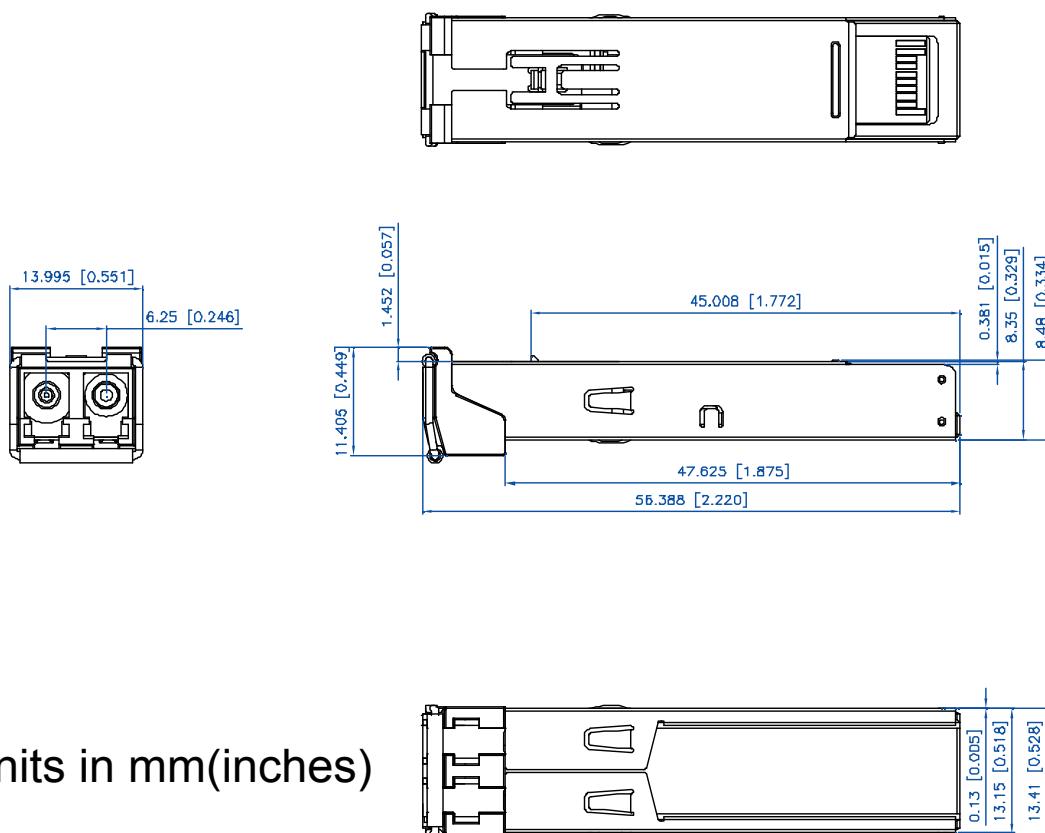
Name of Field	Description of Field	Address	Hex	ASCII
Vendor Name	SFP Vendor name(ASCII)	20	4C	L
		21	55	U
		22	4D	M
		23	49	I
		24	4E	N
		25	45	E
		26	4E	N
		27	54	T
		28	4F	O
		29	49	I
		30	43	C
Vendor OUI	IEEE vendor OUI code for LuminentOIC Inc.	37	00	
		38	06	
		39	B5	
Vendor P/N	Part number in ASCII, e.g. SP-03-LR1-TDA	40	53	S
		41	50	P
		42	30	0
		43	33	3
		44	4C	L
		45	52	R
		46	13	1
		47	54	T
		48	44	D
		49	41	A

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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	$V_{cc}R$	RX Power
16	$V_{cc}T$	TX Power
17	$V_{ee}T$	TX GND
18	TXD+	TX Data Positive
19	TXD-	TX Data Negative
20	$V_{ee}T$	TX GND

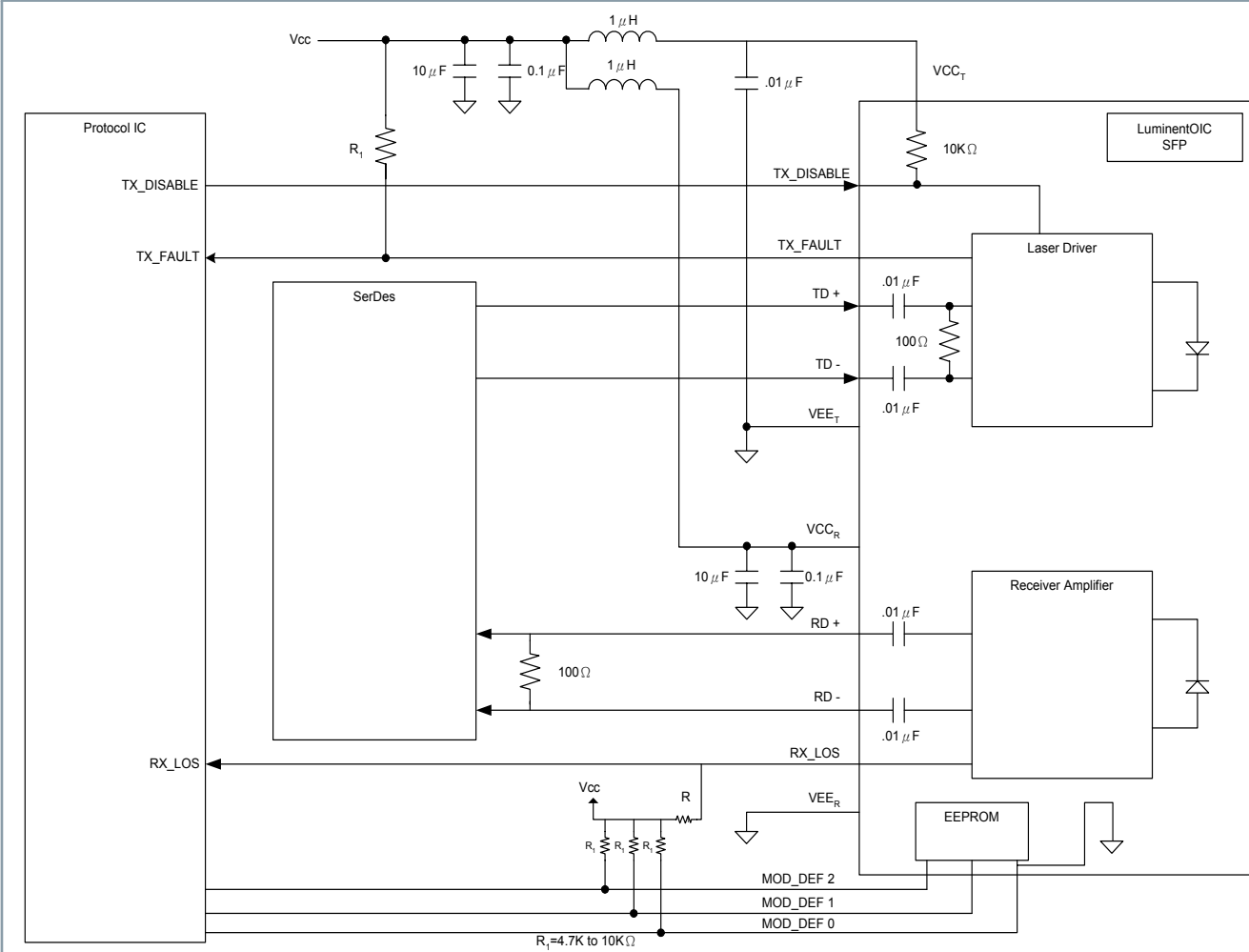
Outline drawing



Units in mm(inches)

SP-03-LR1

Suggested Transceiver interface



SP-03-LR1

Ordering Information

Available Options:

SP-03-LR1-CDA	SP-03-LR1-CDC
SP-03-LR1-TDA	SP-03-LR1-TDC
SP-03-LR1-CNA	SP-03-LR1-CNC
SP-03-LR1-TNA	SP-03-LR1-TNC

Part Numbering Definition:

SP - 03 - LR1 - Temperature Diagnostic Revision - Customer Specific

- SP = Small Form Pluggable
- 03 = OC-3/STM-1 (155 Mbps)
- LR1 = Long Reach 40km
- 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
- Ordering Information
 - A = RoHS-5/6 compliant product (lead exemption)
 - C = RoHS-6/6 compliant product (no exemption)
- Blank = Standard Procedure for Labeling, Serial Number, etc.

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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