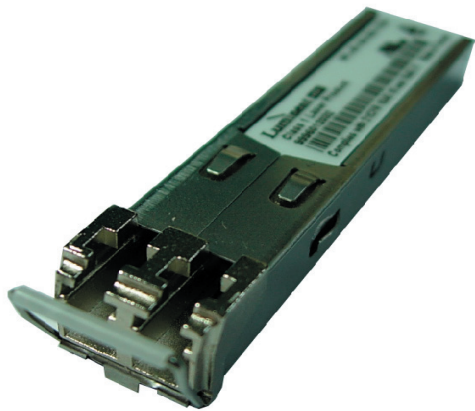


SP-03-ELR



Features

- Single 3.3V supply
- 34dB Minimum Link Budget
- Commercial Temperature Available
- Industrial Temperature Available
- 1550nm DFB Laser
- SFP MSA SFF-8074i Compliant
- GR-253/STM G.957 Compliant
- Digital Diagnostic SFF-8472 Compliant
- Telcordia GR-468 Compliant
- Color Coded Bail Latch Tube: White
- RoHS compliant

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 (-CxA)	T_{op}	-5	-	70	°C
Operating Temperature (-RxA)	T_{op}	-20	-	85	°C
Operating Temperature (-TxA)	T_{op}	-40	-	85	°C
Storage Temperature	T_{st}	-40	-	85	°C
Data Rate OC-3/STM-1	DR	-	155	-	Mbps

a) 20Hz to 155MHz

Transmitter Specifications (Optical)

Parameter	Symbol	Min	Typical	Max	Unit
Optical Power	P_{op}	0	-	5	dBm
Average Launch Power (Tx:Off)	P_{off}	-	-	-45	dBm
Extinction Ratio	ER	10	-	-	dB
Eye Mask	SONET/SDH compliant				
Optical Jitter Generation	Jgen	-	-	0.002	UI
Optical Rise Time ^b	t_r	-	-	1000	ps
Optical Fall Time ^b	t_f	-	-	1000	ps
Mean Wavelength	λ	1480	1550	1580	nm
Spectral Width (20dB)	$\Delta\lambda$	-	-	1	nm
Side Mode Suppression Ratio	SMSR	30	-	-	dB
Dispersion Penalty (120km)		-	0.5	2	dB
Relative Intensity Noise	RIN	-	-	-120	dB/Hz
Reflection Tolerance	rp	-24	-	-	dB

b) 20%-80% values

SP-03-ELR

Transmitter Specifications (Electrical)

Parameter	Symbol	Min	Typical	Max	Unit
Input Differential Impedance	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	1480	1550	1580	nm
LOS Assert		-45	-	-	dBm
LOS De-Assert		-	-	-34	dBm
LOS Hysteresis		0.5	-	-	dB

c) AT BER 10^{-10} , PRBS 2²³-1

d) Operational over 1200 to 1625 nm 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	-	-	1000	ps
Data Output Fall Time	t_f	-	-	1000	ps

Timing and Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Tx Disable Negate Time	t_{on}	-	-	5	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

SP-03-ELR

Diagnostics

Parameter	Range	Accuracy	Unit	Calibration	Formula
Temperature (CDA)	-5 to 70	± 3	° C	External	$T_c(C) = T_{slope} * T_{ad}(16 \text{ bit signed twos complement value}) + T_{offset}$
Temperature (RDA)	-20 to 85	± 3	° C	External	$T_c(C) = T_{slope} * T_{ad}(16 \text{ bit signed twos complement value}) + T_{offset}$
Temperature (TDA)	-40 to 85	± 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	0 to 5	± 3	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	± 3	dBm	External	$RX_PWR(\mu W) = A_0 + A_1 * x + A_2 * x^2 + A_3 * x^3 + A_4 * x^4$

Pin	Function	Notes
1	V_{eeT}	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_{eeR}	RX Ground
10	V_{eeR}	RX Ground
11	V_{eeR}	RX Ground
12	RXD-	RX Data Negative
13	RXD+	RX Data Positive
14	V_{eeR}	RX GND
15	V_{ccR}	RX Power
16	V_{ccT}	TX Power
17	V_{eeT}	TX GND
18	TXD+	TX Data Positive
19	TXD-	TX Data Negative
20	V_{eeT}	TX GND

SP-03-ELR

EEPROM Serial ID (A0h)				
Name of Field	Description of Field	Address	Hex	ASCII
Identifier	Type of serial transceiver	0	03	
Ext. Identifier	Extended identifier of type of serial transceiver	1	04	
Connector	Code for connector type	2	07	
Transceiver	Code for electronic compatibility or optical compatibility	3	00	
		4	08	
		5	04	
		6	00	
		7	00	
		8	00	
		9	00	
		10	00	
Encoding	Code for serial encoding algorithm	11	05	
BR.Nominal	Units of 100 MBits/sec.	12	02	
Reserved	Reserved	13	00	
Length (9µm,km)	9/125 µm fiber, units of km	14	78	
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	
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
		31	20	<<Space>>
		32	20	<<Space>>
		33	20	<<Space>>
34	20	<<Space>>		
35	20	<<Space>>		
Reserved	Reserved	36	00	
Vendor OUI	IEEE Vendor OUI Code For LuminentOIC Inc.	37	00	
		38	06	
		39	B5	

SP-03-ELR

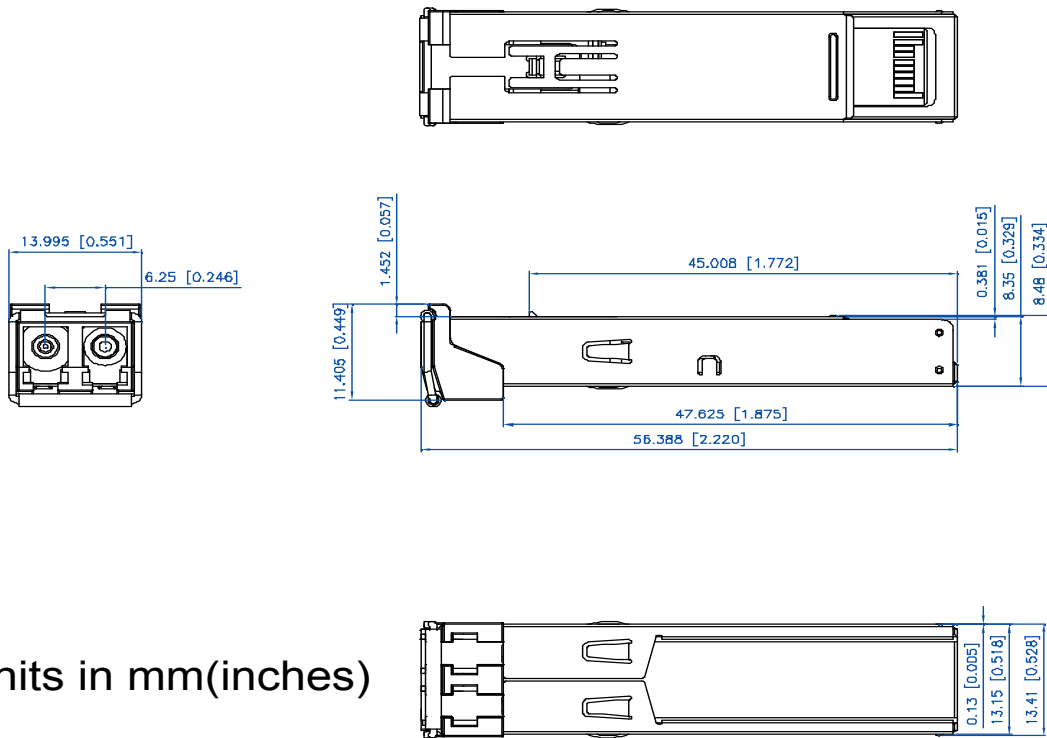
EEPROM Serial ID (A0h)				
Name of Field	Description of Field	Address	Hex	ASCII
Vendor P/N	Part number in ASCII, e.g. SP03ELRCDA	40	53	S
		41	50	P
		42	30	0
		43	33	3
		44	45	E
		45	4C	L
		46	52	R
		47	43	C
		48	44	D
		49	41	A
		50	20	<<Space>>
		51	20	<<Space>>
		52	20	<<Space>>
		53	20	<<Space>>
54	20	<<Space>>		
55	20	<<Space>>		
Vendor Rev.	Revision level for part number provided by vendor (ASCII)	56	41	A
		57	20	<<Space>>
		58	20	<<Space>>
		59	20	<<Space>>
Wavelength	1550 nm	60	06	
		61	0E	
Reserved	Reserved	62	00	
CC_BASE	Check code for Base ID Fields (addresses 0 to 62)	63	xx	
Options	Indicates which optional transceiver signals are implemented	64	00	
		65	1A	
BR,max	Upper bit rate margin, unit of %	66	00	
BR,min	Lower bit rate margin, unit of %	67	00	

SP-03-ELR

EEPROM Serial ID (A0h)				
Name of Field	Description of Field	Address	Hex	ASCII
Vendor S/N	LuminentOIC Serial Number	68	xx	x
		69	xx	x
		70	xx	x
		71	xx	x
		72	xx	x
		73	xx	x
		74	xx	x
		75	xx	x
		76	xx	x
		77	xx	x
		78	xx	x
		79	xx	x
		80	xx	x
		81	xx	x
82	xx	x		
83	xx	x		
Date code	Vendor's manufacturing date code	84	xx	x
		85	xx	x
		86	xx	x
		87	xx	x
		88	xx	x
		89	xx	x
		90	xx	x
91	xx	x		
DD-Function	Diagnostic Monitoring Type	92	58	
		93	B0	
		94	02	
CC_EXT	Check code for the Extended ID Fields (addresses 64 to 94)	95	xx	
Custom EEPROM Programming	Customization data	96-127	00	

SP-03-ELR

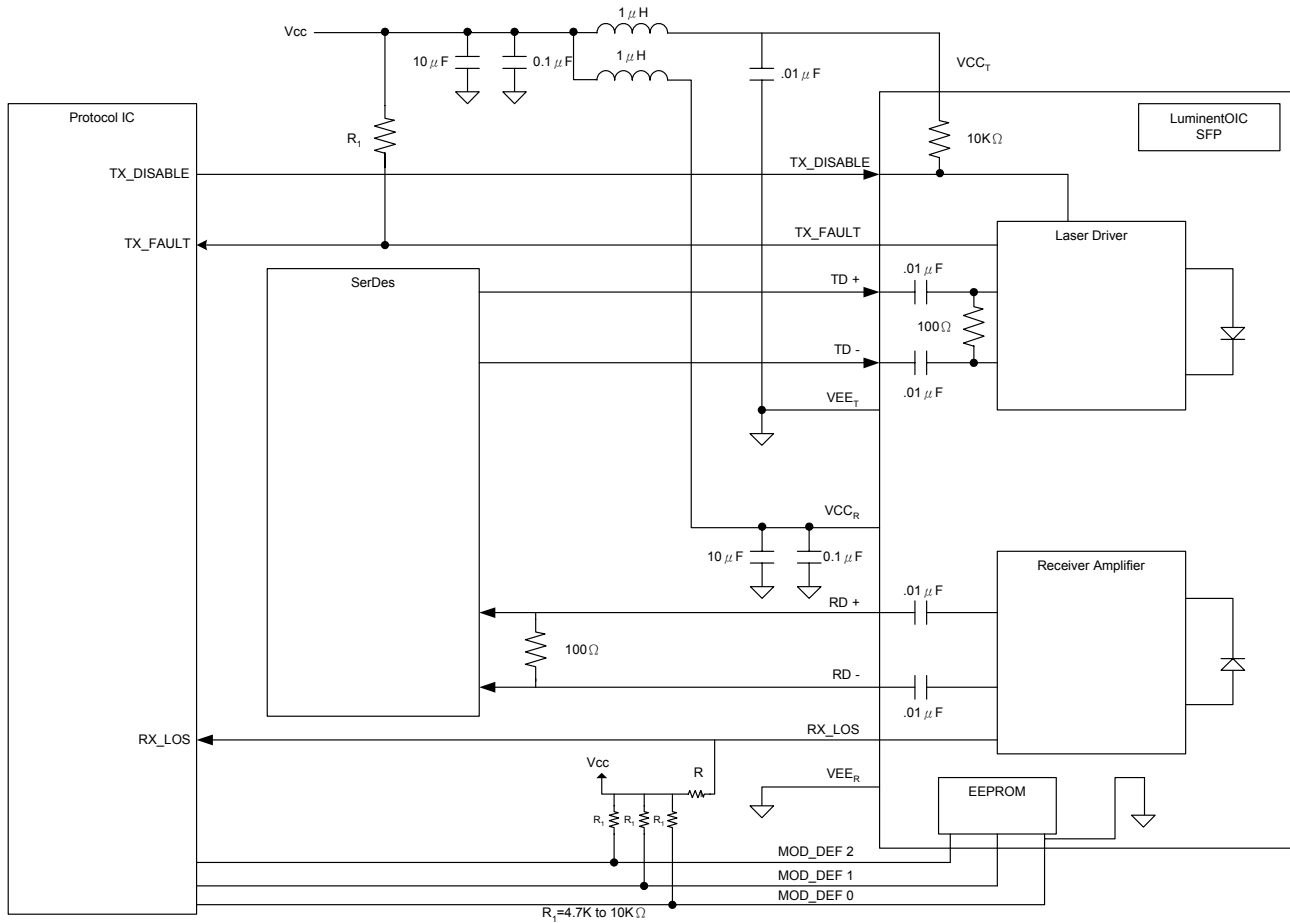
Outline Drawing



Units in mm(inches)

SP-03-ELR

Suggested Transceiver interface



SP-03-ELR

Ordering Information

Available Options:

- | | |
|---------------|---------------|
| SP-03-ELR-CDA | SP-03-ELR-CNA |
| SP-03-ELR-RDA | SP-03-ELR-RNA |
| SP-03-ELR-TDA | SP-03-ELR-TNA |

Part Numbering Definitions:

S P - 0 3 - ELR - Temperature Diagnostic Revision

- SP = Small Form Pluggable
03 = OC3 (155 Mbps)
ELR = Reach 120 km
- Operating Temperature
C = Commercial temperature (-5 to 70 °C)
R = Reduced Industrial (-20 to 85°C)
T = Industrial temperature (-40 to 85 °C)
- Diagnostic
D = Digital Diagnostic (SFF-8472)
N = No Diagnostic
- Design Revision
A = RoHS compliant

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.

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