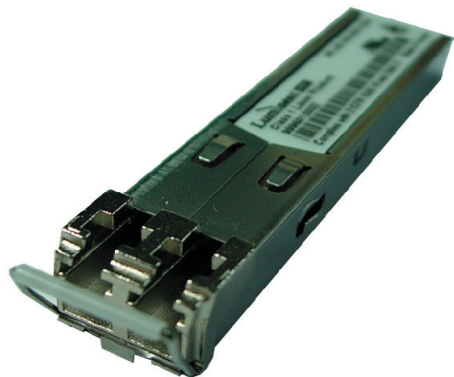


## SPC-03-ELR-xx



## Features

- Single 3.3V supply
- 34dB Minimum Link Budget
- DFB Laser
- 1470nm to 1610nm CWDM Wavelengths
- SFP MSA SFF-8074i Compatible
- Telcordia GR-253 OC-3/ITU-T G.957 STM-1 Compliant
- Commercial and Industrial Temperature
- Digital Diagnostic SFF-8472 Compliant
- RoHS-5 Compliant (lead exemption)
- Telcordia GR-468 Compliant

## General Operation

Parameter	Symbol	Min.	Typical	Max.	Unit
Supply Voltage	$V_{CC}$	3.135	3.3	3.465	V
Total Current (-40 to -5 °C) <sup>a</sup>	$I_{CC}$	-	-	500	mA
Total Current (-5 to 85 °C)	$I_{CC}$	-	-	300	mA
Total Current Each Supply Pin	$I_{CC}$	-	-	300	mA
Power Supply Noise Rejection	PSR	100	-	-	mV <sub>p-p</sub>
Operating Case Temperature (-CXX)	$T_{Op}$	-5	-	70	°C
Operating Case Temperature (-TXX)	$T_{Op}$	-40	-	85	°C
Storage Temperature	$T_{St}$	-40	-	85	°C
Data Rate OC-3/STM-1	DR	-	155	-	Mbps

a) Deviation from the SFP MSA

## Transmitter Specifications (Optical)

Parameter	Symbol	Min	Typical	Max	Unit
Optical Power	$P_{Op}$	0	-	+5	dBm
Average Launch Power (Tx:Off)	$P_{Off}$	-	-	-30	dBm
Extinction Ratio	ER	10	-	-	dB
Eye Mask		-	-	-	SONET/SDH compliant
Optical Jitter Generation	$J_{gen}$	-	-	0.002	UI
Optical Rise Time <sup>b</sup>	$t_r$	-	-	1000	ps
Optical Fall Time <sup>b</sup>	$t_f$	-	-	1000	ps
Wavelength	$\lambda$	1xx1-6.5	1xx1	1xx1+6.5	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

## SPC-03-ELR-xx

## Transmitter Specifications (Electrical)

Parameter	Symbol	Min	Typical	Max	Unit
Input Differential Impedence	$R_{in}$	80	100	120	$\Omega$
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 <sup>c</sup>	$R_{sens,low}$	-	-36	-34	dBm
Receive Power High <sup>c</sup>	$R_{sens,high}$	-10	-	-	dBm
Damage Threshold For Receiver	$P_{in,damage}$	4	-	-	dBm
Wavelength <sup>d</sup>	$\lambda$	1260	-	1620	nm
LOS Assert		-44	-	-	dBm
LOS De-Assert		-	-	-34	dBm
LOS Hysteresis		0.5	-	-	dB

c) at  $10^{-10}$  BER, PRBS  $2^{23}-1$ 

d) Operational over 1200 to 1625 nm range

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	$\mu$ s
Time To Initialize, Including Reset Of Tx Fault	$t_{init}$	-	-	300	ms
Start-up time from <0°C	$t_{start\_up}$	-	-	60	sec
Tx Fault Assert Time	$t_{fault}$	-	-	100	$\mu$ s
Tx Disable To Reset	$t_{reset}$	10	-	-	$\mu$ s
LOS Assert Time	$t_{loss\_on}$	-	-	100	$\mu$ s
LOS De-Assert Time	$t_{loss\_off}$	-	-	100	$\mu$ 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	$V_{LOSnormal}$	$V_{ee}$	-	$V_{ee}+0.5$	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

## SPC-03-ELR-xx

 $\lambda$  Wavelength Ordering

## SPC-03-ELR-xxCDA

See table below for "XX" values

Code	$\lambda_c$	Unit	Code	$\lambda_c$	Unit	Code	$\lambda_c$	Unit	Code	$\lambda_c$	Unit
47	1471	nm	49	1491	nm	51	1511	nm	53	1531	nm
55	1551	nm	57	1571	nm	59	1591	nm	61	1611	nm

## Diagnostics

Parameter	Range	Accuracy	Unit	Calibration	Formula
Temperature (-CDA)	-5 to 70	$\pm 3$	$^{\circ}$ C	Internal	$T_c(C) = T_{ad}(16 \text{ bit signed twos complement})/256$
Temperature (-TDA)	-40 to 85	$\pm 3$	$^{\circ}$ 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	0 to +5	$\pm 3$	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	$\pm 3$	dBm	External	$RX\_PWR(\mu W) = A0 + A1 * x + A2 * x^2 + A3 * x^3 + A4 * x^4$

SPC-03-ELR-xx

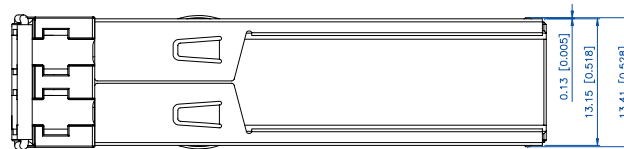
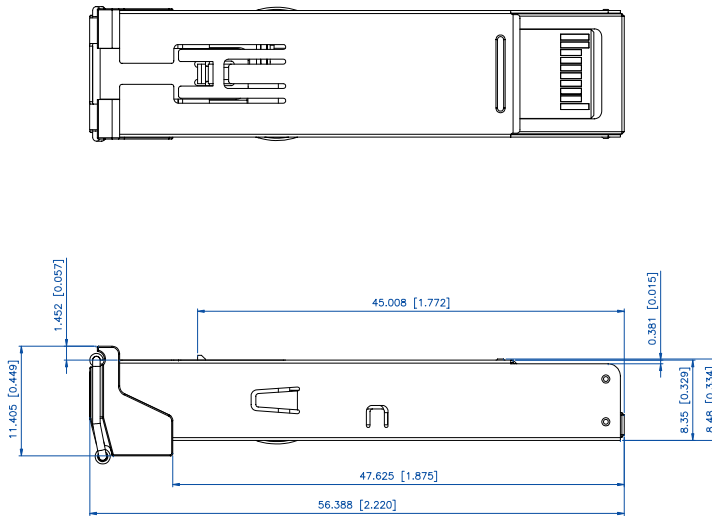
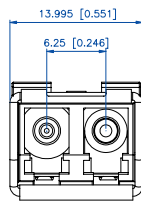
EEPROM Serial ID				
Name of Field	Description of Field	Address	Hex	ASCII
Vendor Name	SFP Vendor name(ASCII)	20	4C	L
		21	55	U
		22	4D	M
		23	49	I
		24	4E	N
		25	45	E
		26	4E	N
		27	54	T
		28	4F	O
		29	49	I
		30	43	C
Vendor OUI	IEEE vendor OUI code for LuminentOIC Inc.	37	00	
		38	06	
		39	B5	
Vendor P/N	Part number in ASCII, e.g. SPC-03-ELR-xxCDA	40	53	S
		41	50	P
		42	43	C
		43	30	0
		44	33	3
		45	45	E
		46	4C	L
		47	52	R
		48	x	x
		49	x	x
		50	43	C
		51	44	D
52	41	A		

Pin	Function	Notes
1	$V_{eeT}$	
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	$V_{ccR}$	TX and RX Power <sup>a</sup>
16	$V_{ccT}$	TX and RX Power <sup>a</sup>
17	$V_{eeT}$	TX GND
18	TXD+	TX Data Positive
19	TXD-	TX Data Negative
20	$V_{eeT}$	TX GND

a) deviations from the SFP MSA

SPC-03-ELR-xx

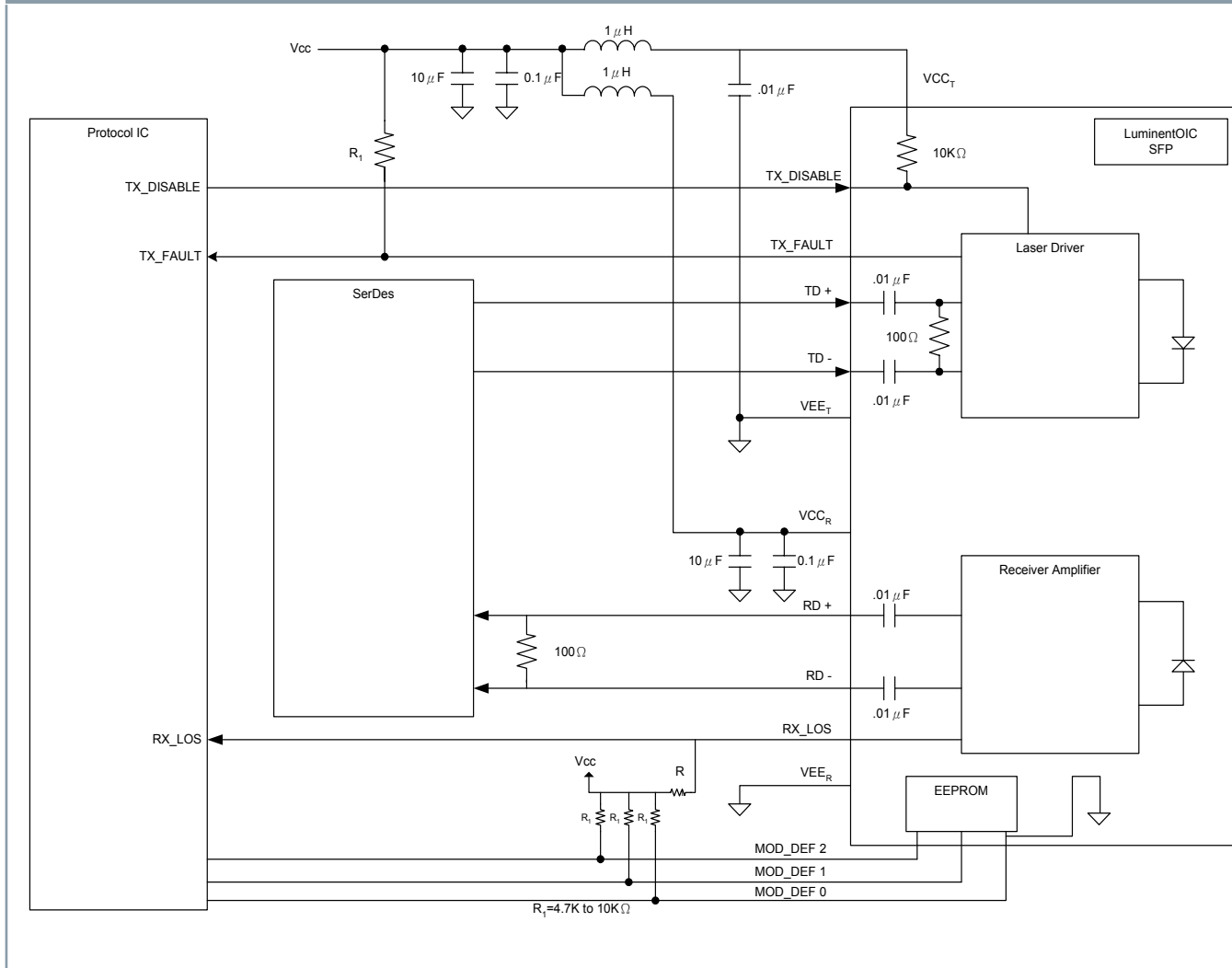
Outline Drawing



Units in mm(inch)

SPC-03-ELR-xx

Suggested Transceiver Interface



Ordering Information

Available Options:  
 SPC-03-ELR-xxCDA  
 SPC-03-ELR-xxCNA  
 SPC-03-ELR-xxTDA  
 SPC-03-ELR-xxTNA

Part Numbering Definition:

**SPC - 03 - ELR - xx Temperature Diagnostic Revision -xx**

SPC = SFP, CWDM  
 03 = Data Rate  
 ELR = Reach

xx = 1xx1 nm center wavelength  
 47,49,51,53,55,57,59,61

Operating Temperature  
 C = Commercial Temp. (-5 to 70° C)  
 T = Commercial Temp. (-40 to 85° C)

D = Digital Diagnostics  
 N = No Diagnostics

A = Design Rev.

xx = Customer Specifics



**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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