

## SPC-GB-EZX-xx



## Features

- Data rate 1.062 to 1.25 Gb/s
- Single 3.3 V supply
- 120 km reach
- 32 dB minimum, 36 dB typical link budget
- Commercial temperature available
- Industrial temperature available
- APD receiver
- CWDM wavelength, DFB laser
- Digital Diagnostic SFF-8472 compliant
- SFP MSA SFF-8074i compliant
- Telcordia GR-468 compliant
- RoHS compliant

## General Operating

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	$I_{CCR}, I_{CCCT}$	-	-	300	mA
Power Supply Rejection <sup>b</sup>	PSR	100	-	-	mV <sub>p-p</sub>
Operating Temperature (-CxA)	$T_{OP}$	-5	-	70	°C
Operating Temperature (-TxA)	$T_{OP}$	-40	-	85	°C
Storage Temperature	$T_{ST}$	-40	-	85	°C
Data Rate GbE	DR	-	1250	-	Mbps
Data Rate FC	DR	-	1062.5	-	Mbps

(a) Denotes deviation from MSA

(b) 20Hz to 155MHz

## Transmitter Specifications (Optical)

Parameter	Symbol	Min	Typical	Max	Unit
Optical Power	$P_{OP}$	0	2	5	dBm
Average Launch Power Of Off Tx	$P_{OFF}$	-	-	-45	dBm
Extinction Ratio (Dynamic)	ER	9	-	-	dB
Eye Mask		802.3ah compliant			
Optical Jitter Random	JR	-	-	147	ps
Optical Jitter Deterministic	JD	-	-	80	ps
Total Jitter	TJ	-	-	200	ps
Optical Rise Time <sup>c</sup>	$t_r$	-	-	260	ps
Optical Fall Time <sup>c</sup>	$t_f$	-	-	260	ps
Mean Wavelength	$\lambda$	1xx1-6.5nm	1xx1	1xx1+6.5nm	nm
Spectral Width (20dB)	$\Delta\lambda$	-	-	1	nm
Side Mode Suppression Ratio	SMSR	30	-	-	dB
Optical Path Penalty at 120 Km <sup>d</sup>	dp	-	1	2	dB
Relative Intensity Noise	RIN	-	-	-120	dB/Hz
Reflection Tolerance <sup>e</sup>	rp	-24	-	-	dB

c) 20%-80% values

d) Measured at BER of  $10^{-12}$ , PRBS of  $2^7-1$ , at eye center

e) 1 dB degradation of receiver sensitivity

## SPC-GB-EZX-xx

## Transmitter Specifications (Electical)

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

Parameter	Symbol	Min	Typical	Max	Unit
Receive Power Low <sup>e</sup>	$R_{sens,low}$	-	-34	-32	dBm
Receive Power High <sup>e</sup>	$R_{sens,high}$	-3	0	-	dBm
Damage Threshold For Receiver	$P_{in,damage}$	6	-	-	dBm
Wavelength	$\lambda$	1200	-	1625	nm
Maximum Reflectance Of Receiver	$RX_r$	-	-	-14	dB
LOS Assert		-45	-	-	dBm
LOS De-assert		-	-	-32	dBm
LOS Hysteresis		0.5	-	-	dB

f) at  $10^{-12}$  BER,<sup>27</sup> -1 PRBS,nominal wavelength

## 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	$t_r$	-	-	175	ps
Data Output Fall Time	$t_f$	-	-	175	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	$\mu$ s
Time To Initialize, Including Reset Of Tx Fault	$t_{init}$	-	-	300	ms
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	$f_{serial\_clock}$	2	-	100	KHz
RX_LOS Voltage (High)		2	-	$V_{cc}$	V
RX_LOS Voltage (Low)		-	-	0.8	V
Receiver Jitter Deterministic	$J_D, receive$	-	-	170	ps
Receiver Jitter Random	$J_R, receive$	-	-	96	ps
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
LOS Output Voltage-Fault	$V_{LOS\ fault}$	2	-	$V_{cc}$	V
LOS Output Voltage-Normal	$V_{LOS\ normal}$	$V_{ee}$	-	$V_{ee}+0.55$	V

## SPC-GB-EZX-xx

 $\lambda$  Wavelength Ordering

## SPC-GB-EZX-xxxDA

See table below for "XX" values

 $\lambda_c$  Wavelength Guide

Code	$\lambda_c$	Unit	Code	$\lambda_c$	Unit	Code	$\lambda_c$	Unit
27	1271	nm	39	1391	nm	51	1511	nm
29	1291	nm	41	1411	nm	53	1531	nm
31	1311	nm	43	1431	nm	55	1551	nm
33	1331	nm	45	1451	nm	57	1571	nm
35	1351	nm	47	1471	nm	59	1591	nm
37	1371	nm	49	1491	nm	61	1611	nm

## Diagnostics

Parameter	Range	Accuracy	Unit	Calibration	Formula
Temperature (-CDA)	-5 to 70	$\pm 3$	$^{\circ}$ C	External	$T_c(C) = T_{slope} * T_{ad}(16 \text{ bit signed twos complement value}) + T_{offset}$
Temperature (-TDA)	-40 to 85	$\pm 3$	$^{\circ}$ 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	$\pm 3$ dB	dBm	External	$TX\_PWR(\mu W) = TX\_PWR_{slope} * TX\_PWR_{ad}(16 \text{ bit unsigned integer}) + TX\_PWR_{offset}$
RX Power	-32 to -3	$\pm 3$ dB	dBm	External	$RX\_PWR(\mu W) = A_0 + A_1 * x + A_2 * x^2 + A_3 * x^3 + A_4 * x^4$

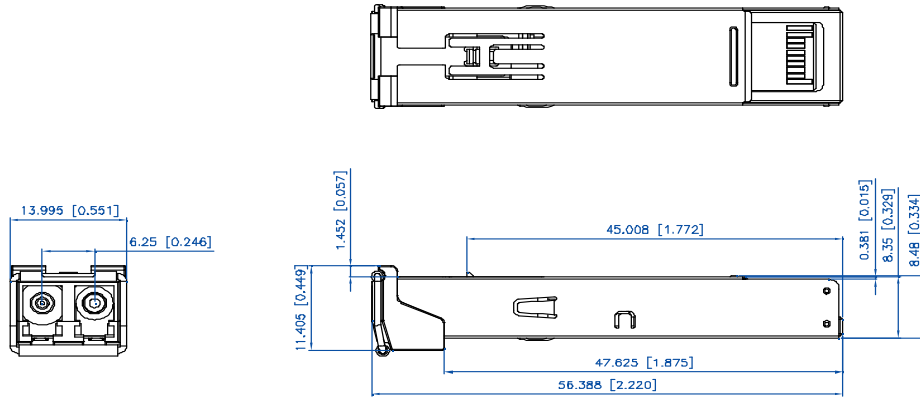
Pin	Function	Notes
1	$V_{eeT}$	TX GND
2	TX_FAULT	Open Collector
3	TX_DISABLE	Internally Pulled High
4	MOD_DEF2	Serial Data Input
5	MOD_DEF1	Serial Clock Input
6	MOD_DEF0	Internally Grounded
7	NC	Not Connected
8	LOS	Open Collector
9	$V_{eeR}$	RX Ground
10	$V_{eeR}$	RX Ground
11	$V_{eeR}$	RX Ground
12	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

SPC-GB-EZX-xx

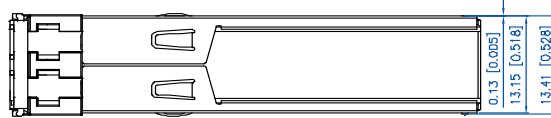
EEPROM Serial ID				
Name of Field	Description of Field	Address	Hex	ASCII
Vendor Name	SFP Vendor Name(ASCII)	20	4C	L
		21	55	U
		22	4D	M
		23	49	I
		24	4E	N
		25	45	E
		26	4E	N
		27	54	T
		28	4F	O
		29	49	I
		30	43	C
Vendor OUI	IEEE Vendor OUI Code For LuminentOIC Inc.	37	00	
		38	06	
		39	B5	
Vendor PN	Part Number in ASCII, e.g. SPC-GB-EZX-xxxDA	40	53	S
		41	50	P
		42	43	C
		43	47	G
		44	42	B
		45	45	E
		46	5A	Z
		47	58	X
		48	xx	x
		49	xx	x
		50	43 or 54	C or T
		51	44	D
52	41	A		

## SPC-GB-EZX-xx

### Outline Drawing

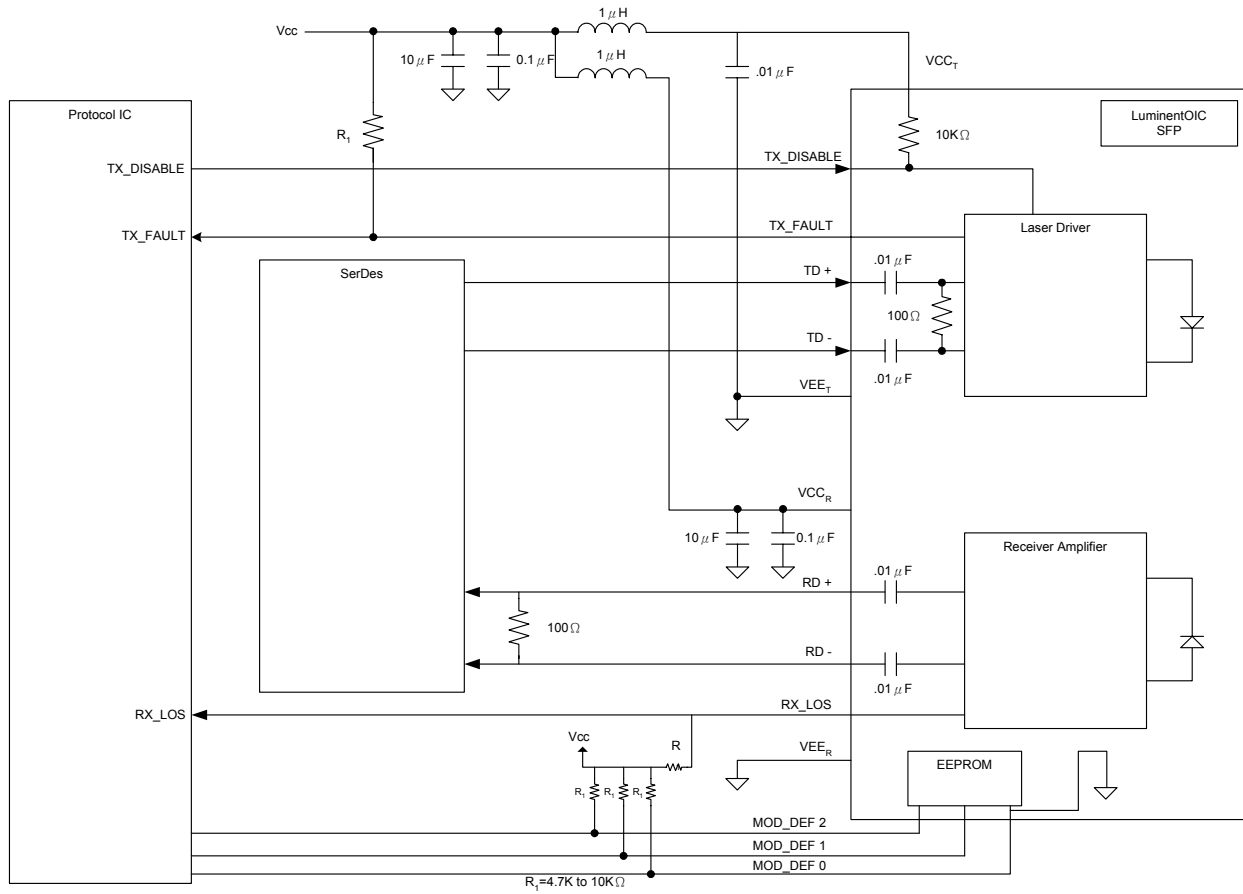


Units in mm(inches)



## SPC-GB-EZX-xx

### Suggested Transceiver Interface



SPC-GB-EZX-xx

Ordering Information

Available Options:

- SPC-GB-EZX-xxCDA    SPC-GB-EZX-xxTDA
- SPC-GB-EZX-xxCNA    SPC-GB-EZX-xxTNA

Part numbering Definition:

SPC - GB - EZX - xx
Temperature
Diagnostic
Revision

- SPC = Small Form Pluggable CWDM  
GB = 1.25 Gbps  
EZX = IEEE 802.3ah Reach 120 km
- xx = CWDM Wavelength
- 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
- 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.

Legal Notes:

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