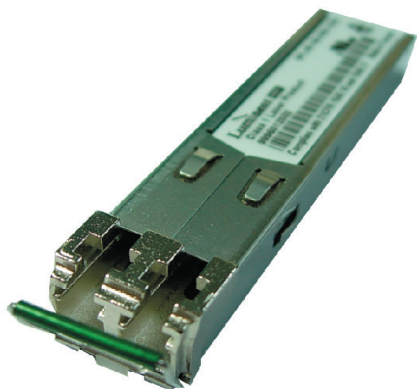


SP-GB-XD



Features

- Data rate 1.062 to 1.25 Gb/s
- Single 3.3 V supply
- 50 km reach
- 19 dB minimum, 23.5 dB typical link budget
- 1550 nm DFB laser
- Commercial Temperature Available (-Cxx)
- Industrial Temperature Available (-Txx)
- SFP MSA SFF-8074i compliant
- Digital Diagnostic SFF-8472 compliant
- Telcordia GR-468 compliant
- Color coded bail latch tube: Green
- 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 ^a	I _{cc}	-	-	500	mA
Total Current, -5 to 85°C	I _{cc}	-	-	300	mA
Power Supply Rejection ^b	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 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}	-5	-2.5	0	dBm
Average Launch Power Of Off Tx	P _{Off}	-	-	-45	dBm
Extinction Ratio (Dynamic)	ER	9	-	-	dB
Eye Mask		802.3 ah compliant			
Total Jitter	TJ	-	-	200	ps
Optical Rise Time ^c	t _r	-	-	260	ps
Optical Fall Time ^c	t _f	-	-	260	ps
Mean Wavelength	λ	1500	1550	1580	nm
Spectral Width (20dB)	Δλ	-	-	1	nm
Side Mode Suppression Ratio	SMSR	30	-	-	dB
Optical Path Penalty at 50 Km ^d	dp	-	1	2	dB
Relative Intensity Noise	RIN	-	-	-120	dB/Hz
Reflection Tolerance ^e	rp	-24	-	-	dB

c) 20%-80% values

d) Measured at BER of 10⁻¹², PRBS of 2⁷-1, at eye center

e) 1dB degradation of receiver sensitivity

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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 ^f	$R_{sens,low}$	-	-26	-24	dBm
Receive Power High ^f	$R_{sens,high}$	-3	0	-	dBm
Damage Threshold For Receiver	$P_{in,damage}$	-	-	6	dBm
Wavelength	λ	1200	-	1625	nm
Maximum Reflectance Of Receiver	RX_r	-	-	-12	dB
LOS Assert		-38	-	-	dBm
LOS De-assert		-	-	-24	dBm
LOS Hysteresis		0.5	-	-	dB

f) 10^{-12} at 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	-	-	260	ps
Data Output Fall Time	t_f	-	-	260	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}	2	-	100	KHz
RX_LOS Voltage (High)		2	-	V_{cc}	V
RX_LOS Voltage (Low)		-	-	0.8	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
LOS Output Voltage-Fault	$V_{LOS\ fault}$	2	-	V_{cc}	V
LOS Output Voltage-Normal	$V_{LOSnormal}$	V_{ee}	-	$V_{ee}+0.5$	V

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Digital Diagnostics (-xDA Versions only)

Parameter	Range	Accuracy	Unit	Calibration	Bit Value	Formula
Temperature (-CDA)	-5 to 70	±3	°C	External	1/256 C	$T_c(C) = T_{slope} * T_{ad}(16 \text{ bit signed twos complement value}) + T_{offset}$
Temperature (-TDA)	-40 to 85	±3	°C	External	1/256 C	$T_c(C) = T_{slope} * T_{ad}(16 \text{ bit signed twos complement value}) + T_{offset}$
Voltage	0 to Vcc	0.1	V	External	100µV	$V(\text{Volts}) = V_{slope} * V_{ad} (16 \text{ bit unsigned integer}) + V_{offset}$
Bias Current	0 to 120	5	mA	External	-	$I(\text{mA}) = I_{slope} * I_{ad}(16 \text{ bit unsigned integer}) + I_{offset}$
Tx Power	-5 to 0	±3 dB	dBm	External	-	$Tx_PWR(\mu W) = Tx_PWR_{slope} * Tx_PWR_{ad}(16 \text{ bit unsigned integer}) + Tx_PWR_{offset}$
Rx Power	-24 to -3	±3 dB	dBm	External	-	$Rx_PWR(\mu W) = A_0 + A_1 * x + A_2 * x^2 + A_3 * x^3 + A_4 * x^4$

EEPROM Serial ID

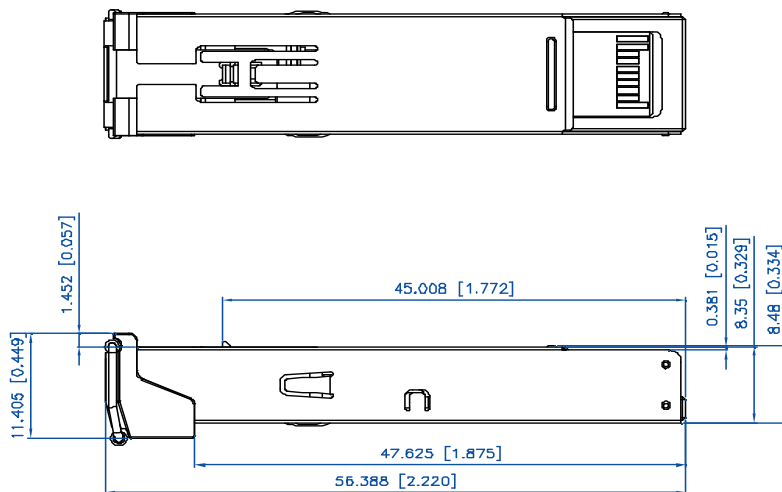
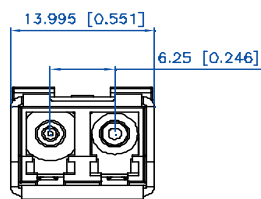
Name of Field	Description of Field	Address	Hex	ASCII
Vendor Name	SFP Vendor Name(ASCII)	20	4C	L
		21	55	U
		22	4D	M
		23	49	I
		24	4E	N
		25	45	E
		26	4E	N
		27	54	T
		28	4F	O
		29	49	I
30	43	C		
Vendor OUI	IEEE Vendor OUI Code For LuminentOIC Inc.	37	00	
		38	06	
		39	B5	
Vendor PN	Part Number in ASCII,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

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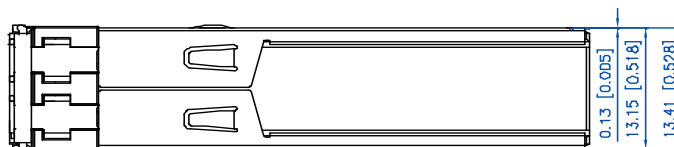
Pin	Function	Notes
1	V _{ee} T	TX GND
2	TX_FAULT	Open Collector
3	TX_DISABLE	Internally Pulled High
4	MOD_DEF2	Serial Data Input
5	MOD_DEF1	Serial Clock Input
6	MOD_DEF0	Internally Grounded
7	NC	Not Connected
8	LOS	Open Collector
9	V _{ee} R	RX Ground
10	V _{ee} R	RX Ground
11	V _{ee} R	RX Ground
12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

SP-GB-XD

Outline Drawing

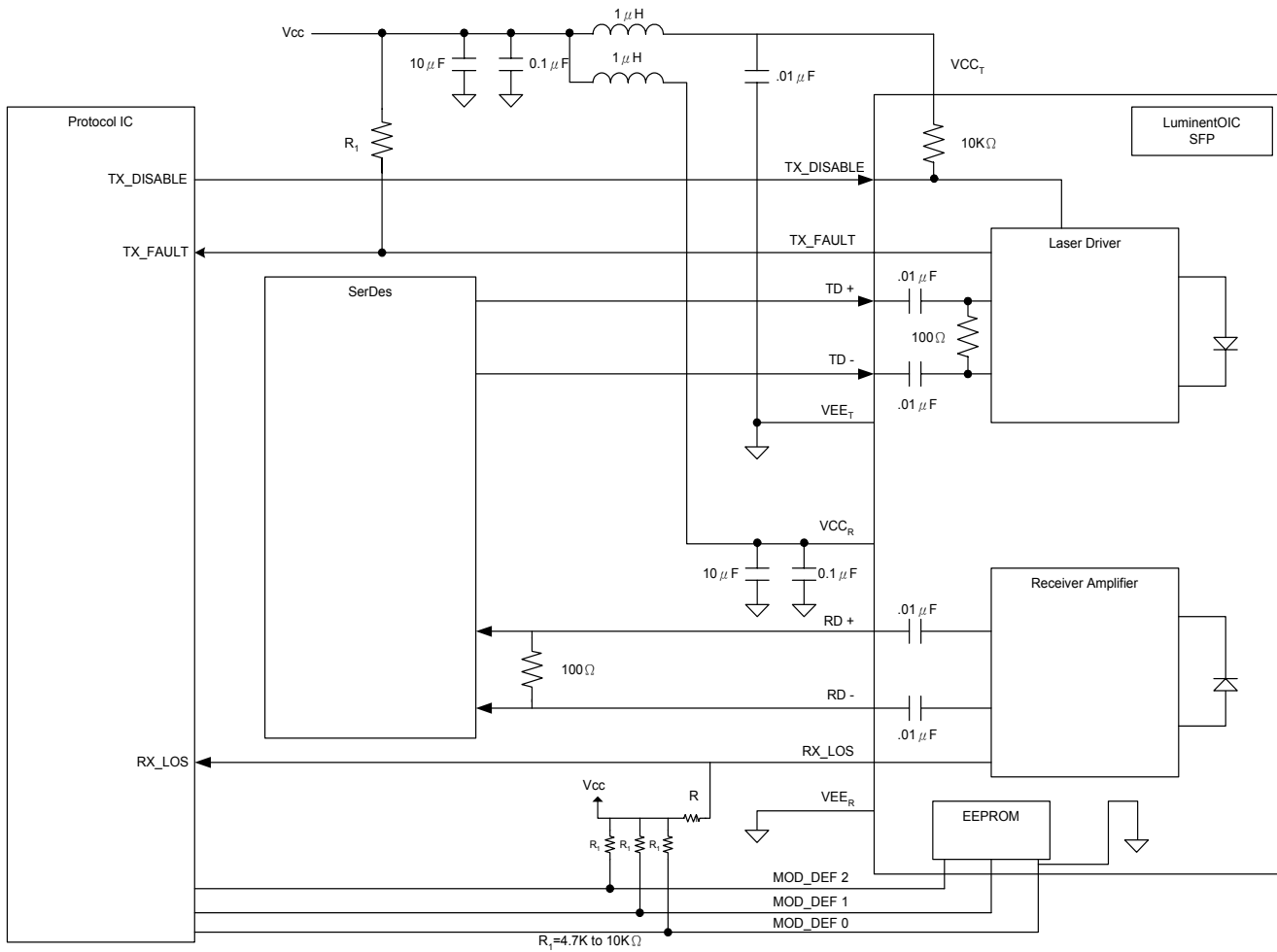


Units in mm(inches)



SP-GB-XD

Suggested Transceiver Interface



SP-GB-XD

Ordering Information

Available Options:
 SP-GB-XD-CDA
 SP-GB-XD-CNA
 SP-GB-XD-TDA
 SP-GB-XD-TNA

Part numbering Definition:

SP - GB - XD - Temperature Diagnostic Revision

- SP = Small Form Pluggable
 GB = 1.25 Gbps
 XD = Extended Reach 50 km
- 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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