

LXP-L31-10DI

SFP+ 10Gb/s 1310nm Single-mode 20km DDM

PRODUCT FEATURES

- Compliant to SFP+ MSA
- Fully RoHS Compliant
- All metal housing for superior EMI performance
- Operating data rate from 8.5Gbps to 10Gbps
- Uncooled 1310nm DFB Laser
- High sensitivity PIN photodiode and TIA
- Up to 20km
- LC duplex connector
- Hot pluggable 20pin connector
- Low power consumption < 1.0W
- -40 °C to 85 °C operating wide temperature range
- Single +3.3V ±5% power supply
- Digital Diagnostic Monitoring sff-8472 Rev 10.2 compliant
- Real time monitoring of :
 - Transmitted optical power
 - Received optical power
 - Laser bias current
 - Temperature
 - Supply voltage

APPLICATIONS

- 10GBASE –LR/LW 10G Ethernet
- 10GFC
- 8GFC

Compliance

- IEEE 802.3ae 10GBASE –LR/LW
- SFF-8431 Rev 3.0
- SFF-8472 Rev 10.2
- 10GFC Rev 4.0
- FC-PI-4 Rev 7.0

PRODUCT DESCRIPTION

The LXP-L31-10DI 1310nm DFB 10Gigabit Transceiver is designed to transmitter and receive serial optical data over single mode optical fiber with 20km.

They are compliant with SFF-8431,SFF-8472,10GFC Rev4.0 ,FC-PI-4 Rev7.0 and IEEE802.3ae 10GBASE-LR /LW .

The transmitter converts serial CML electrical data into serial optical data compliant with the IEEE802.3ae standard.An open collector compatible Transmit Disable (Tx_Dis)is provided .When Tx_ Dis is asserted high,Transmitter is turned off .

The receiver converts serial optical data into serial CML electrical data .An open collector compatible loss of signal is provided. The RX_ LOS signal indicates insufficient optical power for reliable signal reception at the receiver. Digital diagnostics functions are available via 2-wire serial interface ,as specified in sff-8472 .

The optical output can be disabled by a TTL logic high-level input of Tx Disable, and the system also can disable the module via I2C. Tx Fault is provided to indicate that degradation of the laser. Loss of signal (LOS) output is provided to indicate the loss of an input optical signal of receiver or the link status with partner. The system can also get the LOS (or Link)/Disable/Fault information via I2C register access.

Ordering information

Part No	package	Data rate	Tx	Optical Power	Rx	Top	Reach	other
LXP-L31-10DI	SFP+	8.5G~ 10.52G	1310nm DFB	-8.2~ +0.5dBm	PIN	<-14.4dBm	-40~ 85 °C	DDM

I. Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Ref.
Storage Temperature	T _s	-40		85	°C	
Storage Ambient Humidity	H _A	5		95	%	

II. Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note	
Case Operating Temperature	T _{case}	-40		85	°C		
Ambient Humidity	HA	5		70	%	Non-condensing	
Power Supply Voltage	V _{cc}	3.13	3.3	3.47	V		
Bit Rate	BR		9.953		Gbs	10GBASE- LW	
			10.3125			10GBASE- LR	
			8.5			800-SM-LC-L	
			10.51875			1200-SM-LL-L	
Bit Error Ratio	BER				10-12		
Max Supported link Length			20KM				
Coupled Fiber		Single mode fiber					9/125um SMF

III. Electircal Characteristics ($T_c = -40^{\circ}\text{C}$ to 85°C and $V_{cc} = 3.14$ to 3.46)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage	Vcc	3.14	3.3	3.46	V	
Supply Current	Icc			300	mA	
Transmitter						
Input Differential Impedance	Rin	80	100	120	Ω	
Differential Data Input Swing	Vin	100		1000	mVp-p	
Transmit Disable Voltage	Vdis	2			V	
Transmit Enable Voltage	Ven	Vee		Vee+0.8	V	
Transmit Fault Assert Voltage	Vfa	2.2			V	
Transmit Fault De-Assert Voltage	Vfda	Vee		Vee+0.4	V	
Receiver						
Differential Data Output Swing	Vod	300	600	840	mVp-p	
Output Rise Time	Trise		25		ps	20%~80%
Output Fall Time	Tfall		25		ps	20%~80%
LOS Fault	Vlosft	2		Vcc	V	
LOS Normal	Vlosnr	Vee		Vee+0.8	V	

IV. Optical Characteristics($T_c = -40^{\circ}\text{C}$ to 85°C and $V_{cc} = 3.14\text{V}$ to 3.46V)

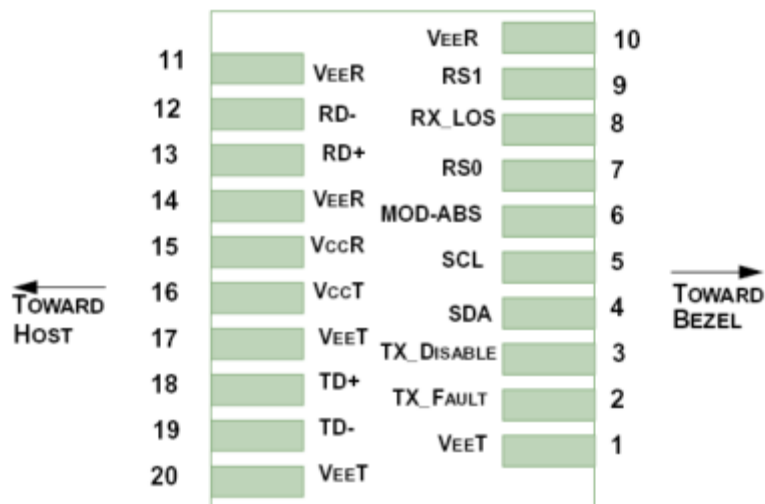
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Nominal Wavelength	λ	1260	1310	1350	nm	
Spectral width	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Optical Modulation Amplitude	Poma	-5.4			dBm	
Optical Output Power	Pav	-8.2		0.5	dBm	
Extinction Ratio	ER	3.5			dB	
Transmitter and Dispersion Penalty	TDP			3.2	dB	
Launch Power in OMA Minus TDP		-6.2			dBm	
Average Launch Power of OFF Transmitter	Poff			-35	dBm	
Relative Intensity Noise	Rin			-128	dB/HZ	
Optical Return Loss Tolerance	ORLT			12	dB	
Receiver						
Center Wavelength	λ	1260	1310	1610	nm	
Average Receiver Power	Pavg	-	-	-14.4	dBm	
Receiver Sentitivity (OMA)	Rsense1			-12.6	dBm	1
Stressed Sensitivity(OMA)	Rsense2			-10.3	dBm	2
Receiver Satuation	Rsat	0			dBm	
Receiver Reflectance	Rrefl			-12	dB	
Los Assert LOS	LOSd	-30			dBm	
Los De-Assert LOS	LOSa			-17	dBm	

Los Hysteresis		0.5				dB	
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Notes:

1. Sensitivity for 10G PRBS 2*23-1 and BER better than or equal to 10E-12
2. The stressed sensitivity value in the table are for system level BER measurement which include the effects of CDR circuit.

V. Pin Diagram

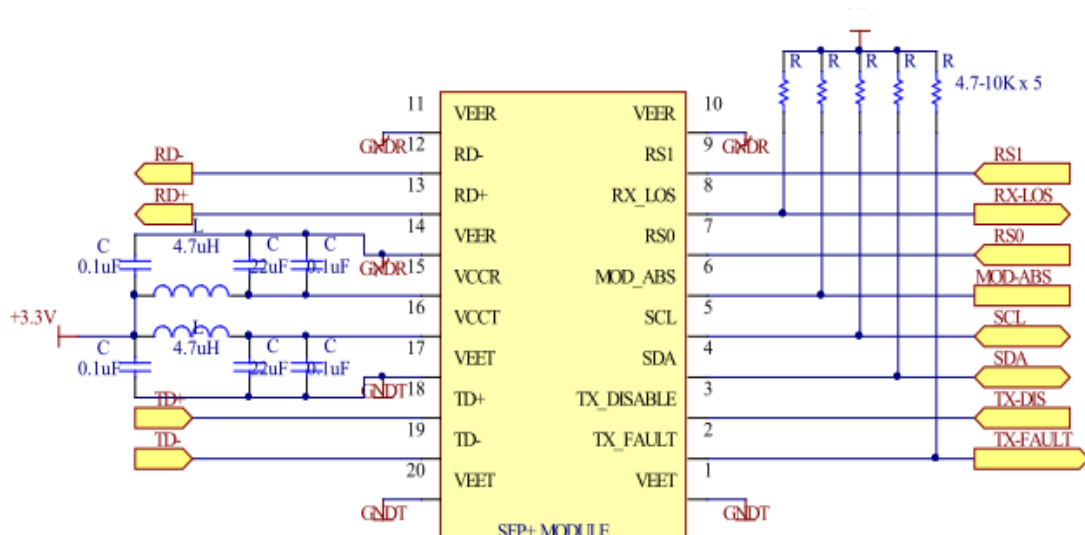


VI. Pin Descriptions

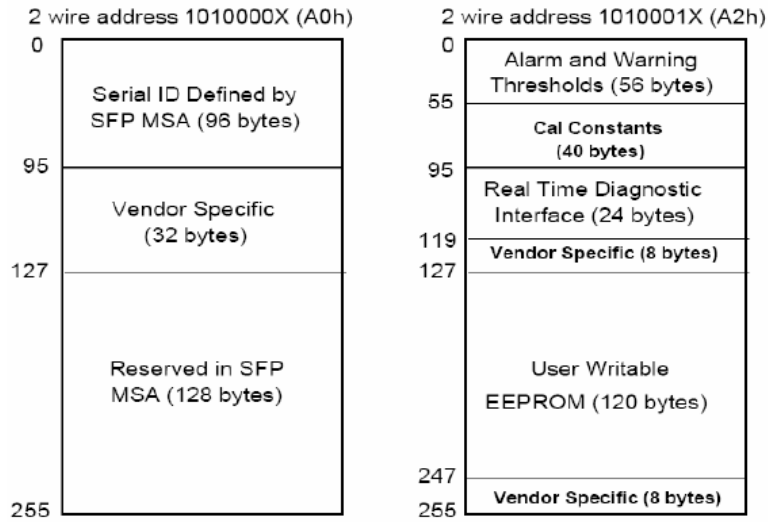
Pin	Symbol	Name	Description
1,17,20	VeeT	Transmitter Signal Ground	These pins should be connected to signal ground on the host board.
2	TX Fault	Transmitter Fault Out (OC)	Logic“1”Output=Laser Fault(Laser off before t_fault) Logic“0”Output=Normal Operation This pin is open collector compatible,and should be pulled up to Host Vcc with a 10kΩ resistor
3	TX Disable	Transmitter Disable In (LVTTTL)	Logic “1”Input(or no connection)=laser off Logic “0”Input = Laser on This pin is internally pulled up to VccT with a 10kΩ resistor
4	SDA	Module Definition Identifiers	Serial ID with SFF-8472 Diagnostics Module Definition pins should be pulled up to Host Vcc with 10 kΩ resistors.
5	SCL		
6	MOD-ABS		
7	RS0	ReceiverRateSelect(LVTTTL)	These pins have an internal 30 kΩ pull-down to ground. A Signal on either of these pins will not affect module performance.
9	RS1	Transmitter Rate Select(LVTTTL)	

8	LOS	Loss of signal Out(OC)	Sufficient optical signal for potential BER<1x10 ⁻¹² =Logic "0" Insufficient optical signal for potential BER<1x10 ⁻¹² =Logic "1" This pin is open collector compatible ,and should be pulled up to Host Vcc with a 10 kΩ resistor
10,11,14	VeeR	Receiver Signal Ground	This pins should be connected to signal ground on the host board.
12	RD-	Receiver Negative Data Out(CML)	Light on = Logic "0"Output Receiver Data output is internally AC coupled and series terminated with a 50Ω resistor.
13	RD+	Receiver Positive Data Out(CML)	Light on = Logic "1"Output Receiver Data output is internally AC coupled and series terminated with a 50Ω resistor.
15	VccR	Receiver Power Supply	This pin should be connected to a filtered +3.3V power supply on the host board .See Figure3.Recommended power supply filter
16	VccT	Transmitter Power Supply	This pin should be connected to a filtered +3.3V power supply on the host board .See Figure3.Recommended power supply filter

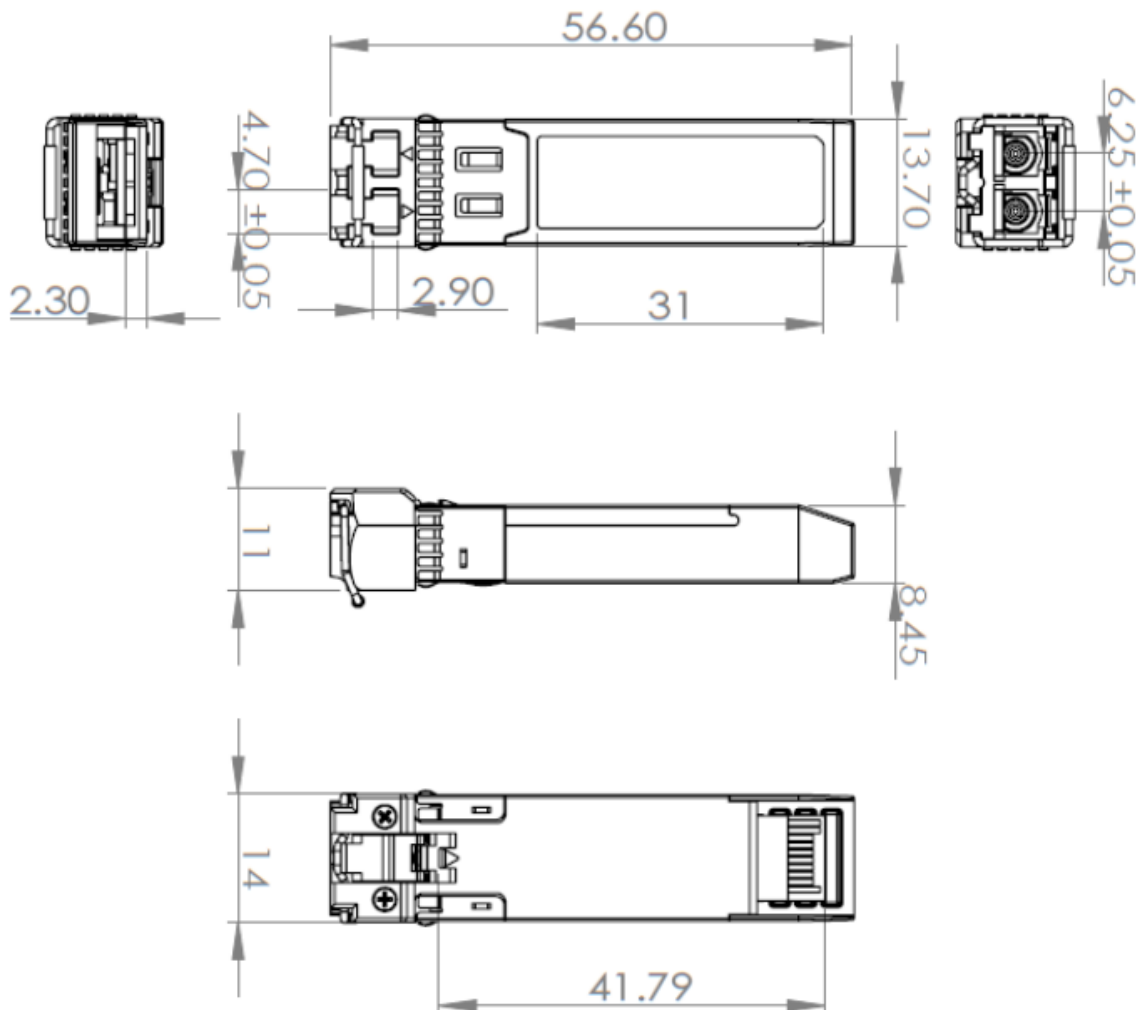
VII. Typical application circuit



VIII. Digital Diagnostic Interface Definition



IX. Mechanical Specifications(Unit: mm)



Revision History

Version No.	Date	Description
1.0	June 24, 2020	Preliminary datasheet