

## XFP 10G Bi-Di Transceiver

### SOXPB-2399-20

### Features :

- Support 10GBASE-LR/10GBASE-LW/10G Fiber Channel application
- XFP MSA Rev 4.5 compliant
- Multi rate of up to 11.3Gbps
- Transmission distance up to 10km and 40KM
- +3.3V single power supply
- Low power consumption
- Operating case temp : 0~+70°C
- RoHS 6/6 compliant

### Absolute Maximum Ratings

Table 1- Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Supply Voltage	V <sub>CC3</sub>	-0.5	-	+3.6	V	
Storage Temperature	T <sub>s</sub>	0	-	+70	°C	
Operating Humidity	RH	+5	-	+95	%	

### Recommended Operating Conditions

Table 2- Recommended operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	T <sub>C</sub>	0	-	+70	°C	
Power Supply Voltage	V <sub>CC</sub>	3.14	3.3	3.47	V	
Power Supply Current	I <sub>CC</sub>	-	-	450	mA	
Power Dissipation	P <sub>d</sub>	-	-	1.5	W	
Bit Rate	BR	-	10.3125	-	Gbps	

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### Electrical Characteristics

Table 3- Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units	Notes	
<b>Transmitter</b>							
Differential Data Input Swing	$V_{in,P-P}$	120	-	850	mV <sub>PP</sub>		
Input Differential Impedance	$Z_{IN}$	80	100	120	$\Omega$		
Tx_Fault	Normal Operation	$V_{OL}$	0	-	+0.4	V	
	Transmitter Fault	$V_{OH}$	2.0	-	$V_{CC}$	V	
Tx_Disable	Normal Operation	$V_{IL}$	0	-	+0.8	V	
	Laser Disable	$V_{IH}$	2.0	-	$V_{CC}+0.3$	V	
<b>Receiver</b>							
Differential Date Output	$V_{out}$	100	-	860	mV		
Output Differential Impedance	$Z_D$	80	100	120	$\Omega$		
Output Rise Time(20-80%)	$T_R$	20	-	-	ps		
Output Fall Time (20-80%)	$T_F$	20	-	-	ps		
Rx_LOS	Normal Operation	$V_{OL}$	0	-	+0.4	V	
	Lose Signal	$V_{OH}$	2.0	-	$V_{CC}$	V	

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### Optical Characteristics

**Table 4-Optical Characteristics**

**SOXPB-2399-20 (10G Bi-Di 1270 TX 1330 RX 10KM-20KM)**

**SOXPB-3299-20 (10G Bi-Di 1330 TX 1270 RX 10KM-20KM)**

Parameter	Symbol	Unit	Min.	Typ.	Max.	Notes
<b>Optical transmitter Characteristics</b>						
Bit Rate	BR	Gbps	9.95	10.3125	11.3	
Center Wavelength Range	$\lambda_c$	nm	1250	1270	1290	SOCX-2396-10L
			1310	1330	1350	SOCX-3296-10L
Average Launch power Tx_off	P <sub>off</sub>	dBm	-	-	-45	
Launch Optical Power	P <sub>0</sub>	dBm	-7.5	-	0	1
Extinction Ratio	EX	dB	3.8	-	-	
Jitter P-P	JP	ps	-	-	20	
Jitter RMS	JR	ps	-	-	5	
Optical Rise/Fall time	Tr/tf	ps	20	-	100	
Eye Diagram	Compliant With IEEE 802.3-2005					
<b>Optical receiver Characteristics</b>						
Bit Rate	BR	Gbps	9.95	10.3125	11.3	
Receiver Sensitivity	RS	dBm	-	-	-14	2
Overload Input Optical Power	P <sub>IN</sub>	dBm	0	-	-	2
Center Wavelength Range	$\lambda_c$	nm	1310	1330	1350	SOCX-2396-10L
			1250	1270	1290	SOCX-3296-10L
LOS	LOS <sub>D</sub>	dBm	-	-	-15	
	LOS <sub>A</sub>		-24.5	-	-	
LOS Hysteresis		dB	0.5	-	-	

**SOXPB-2399-40 (10G Bi-Di 1270 TX 1330 RX 20KM-40KM)**

**SOXPB-3299-40 (10G Bi-Di 1330 TX 1270 RX 20KM-40KM)**

Parameter	Symbol	Unit	Min.	Typ.	Max.	Notes
<b>Optical transmitter Characteristics</b>						
Bit Rate	BR	Gbps	9.95	10.3125	11.3	
Center Wavelength Range	$\lambda_c$	nm	1250	1270	1290	SOCX-2396-40L
			1310	1330	1350	SOCX-3296-40L

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Average Launch power Tx_off	P <sub>off</sub>	dBm	-	-	-45	
Launch Optical Power	P <sub>0</sub>	dBm	1	-	6.5	1
Extinction Ratio	EX	dB	3.8	-	-	
Jitter P-P	JP	ps	-	-	20	
Jitter RMS	JR	ps	-	-	5	
Optical Rise/Fall time	Tr/tf	ps	20	-	100	
Eye Diagram	Compliant With IEEE 802.3-2005					
<b>Optical receiver Characteristics</b>						
Bit Rate	BR	Gbps	9.95	10.3125	11.3	
Receiver Sensitivity	RS	dBm	-	-	-14	2
Overload Input Optical Power	P <sub>IN</sub>	dBm	0	-	-	2
Center Wavelength Range	$\lambda_c$	nm	1310	1330	1350	SOCX-2396-40L
			1250	1270	1290	SOCX-3296-40L
LOS	LOS <sub>D</sub>	dBm	-	-	-15	
	LOS <sub>A</sub>		-24.5	-	-	
LOS Hysteresis		dB	0.5	-	-	

**Note:**

1. Coupled into 9/125 SMF.
2. Measured with PRBS 2<sup>31</sup>-1 test pattern @10.3125Gbps.BER=10E-12

# XFP 10G Bi-Di Transceiver

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### Recommended Interface Circuit

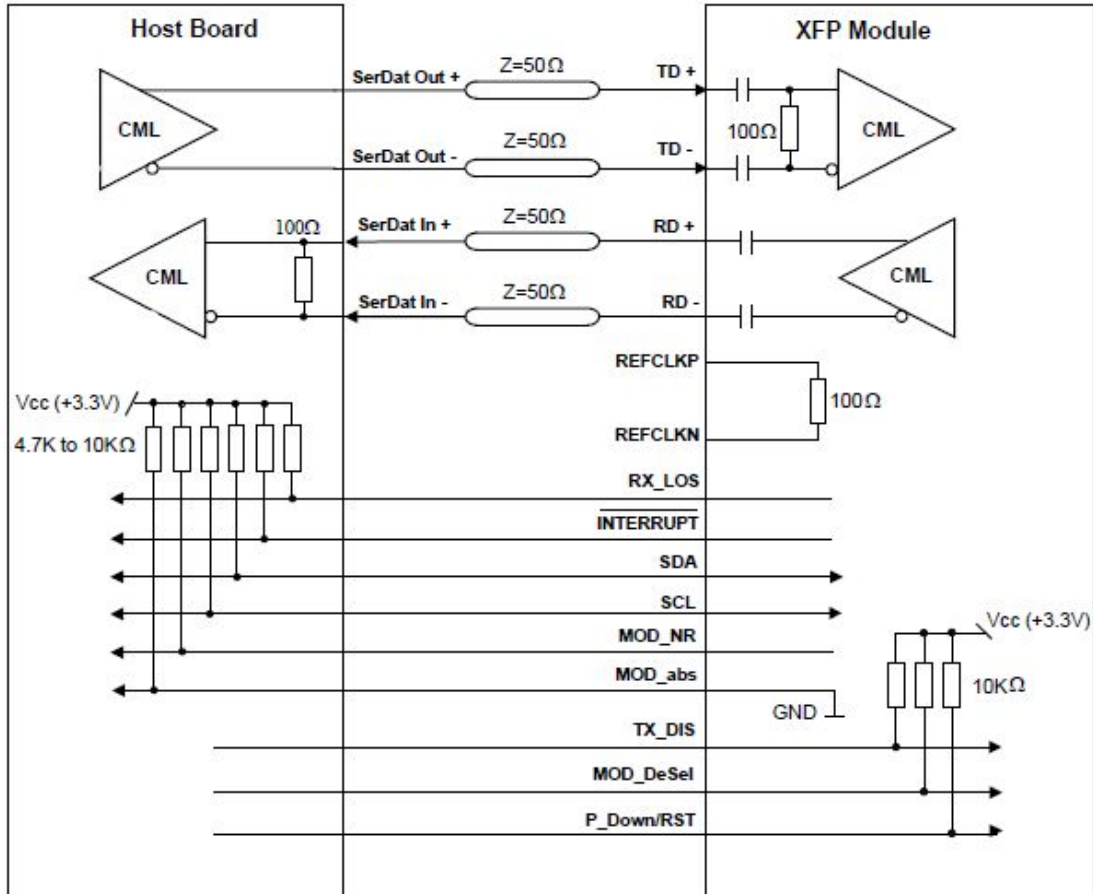


Figure 1, Recommended Interface Circuit

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### Recommended Host Board Power Supply Circuit

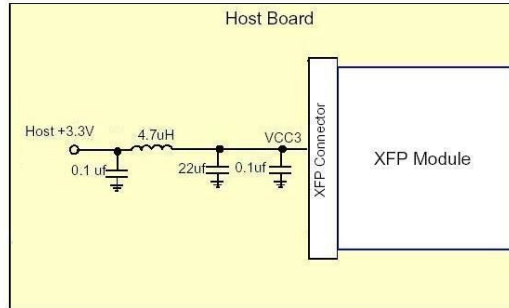


Figure 2, Recommended Host Board Power Supply Circuit

### Pin arrangement

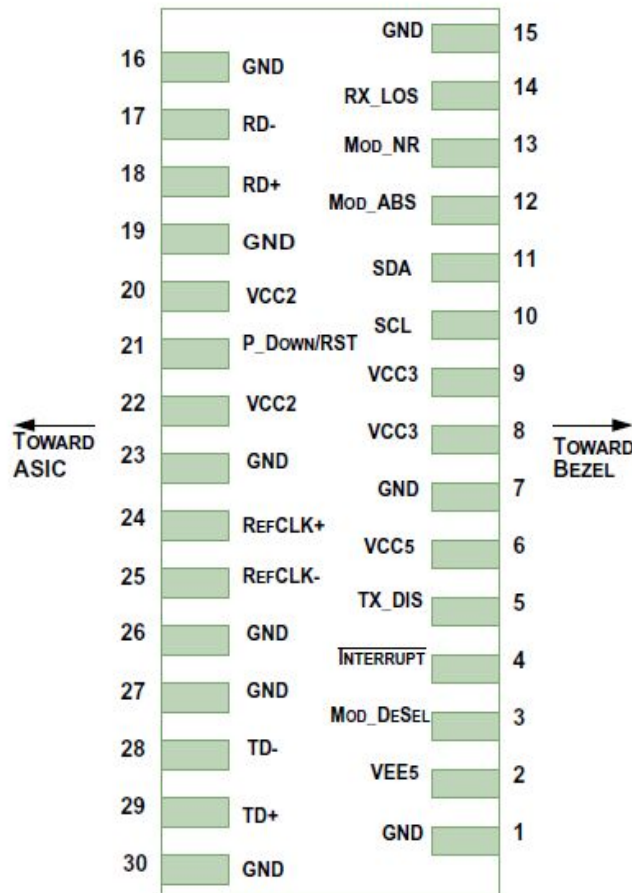


Figure 3, Pin View

### Table 5-Pin Function Definition

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Pin	Logic	Symbol	Name/Description	Notes
1		GND	Module Ground	1
2		VEE5	Optional -5.2V Power Supply (Not implemented)	3
3	LVTTL-I	Mod_Desel	Module De-select; When held low allows the module to respond to 2-wire serial interface	
4	LVTTL-O	Interrupt	Interrupt; Indicates presence of an important condition which can be read over the 2-wire serial interface	2
5	LVTTL-I	TX_DIS	Transmitter Disable; Turns off transmitter laser output	
6		VCC5	+5V Power Supply (Not implemented)	
7		GND	Module Ground	1
8		VCC3	+3.3V Power Supply	
9		VCC3	+3.3V Power Supply	
10	LVTTL-I/O	SCL	2-Wire Serial Interface Clock	2
11	LVTTL-I/O	SDA	2-Wire Serial Interface Data Line	2
12	LVTTL-O	Mod_ABS	Indicates Module is not present. Grounded in the Module	2
13	LVTTL-O	Mod_NR	Module Not Ready; Indicating Module Operational Fault	2
14	LVTTL-O	RX_LOS	Receiver Loss Of Signal Indicator	2
15		GND	Module Ground	1
16		GND	Module Ground	1
17	CML-O	RD-	Receiver Inverted Data Output	
18	CML-O	RD+	Receiver Non-Inverted Data Output	
19		GND	Module Ground	1
20		VCC2	+1.8V Power Supply (Not implemented).	3
21	LVTTL-I	P_Down/RS T	Power down; When high, requires the module to limit power consumption to 1.5W or below. 2-Wire serial interface must be functional in the low power mode.	
			Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle.	
22		VCC2	+1.8V Power Supply (Not implemented)	3
23		GND	Module Ground	1
24	PECL-I	RefCLK+	Not used, internally terminated to 50ohm (100ohm diff).	4
25	PECL-I	RefCLK-	Not used, internally terminated to 50ohm (100ohm diff).	4
26		GND	Module Ground	1
27		GND	Module Ground	1

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28	CML-I	TD-	Transmitter Inverted Data Input	
29	CML-I	TD+	Transmitter Non-Inverted Data Input	
30		GND	Module Ground	1

Note:

1. Module ground pins GND are isolated from the module case and chassis ground within the module.
2. Shall be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.45V on the host board.
3. The pins are open within module.
4. Reference Clock is not required

### Digital Diagnostic Memory Map

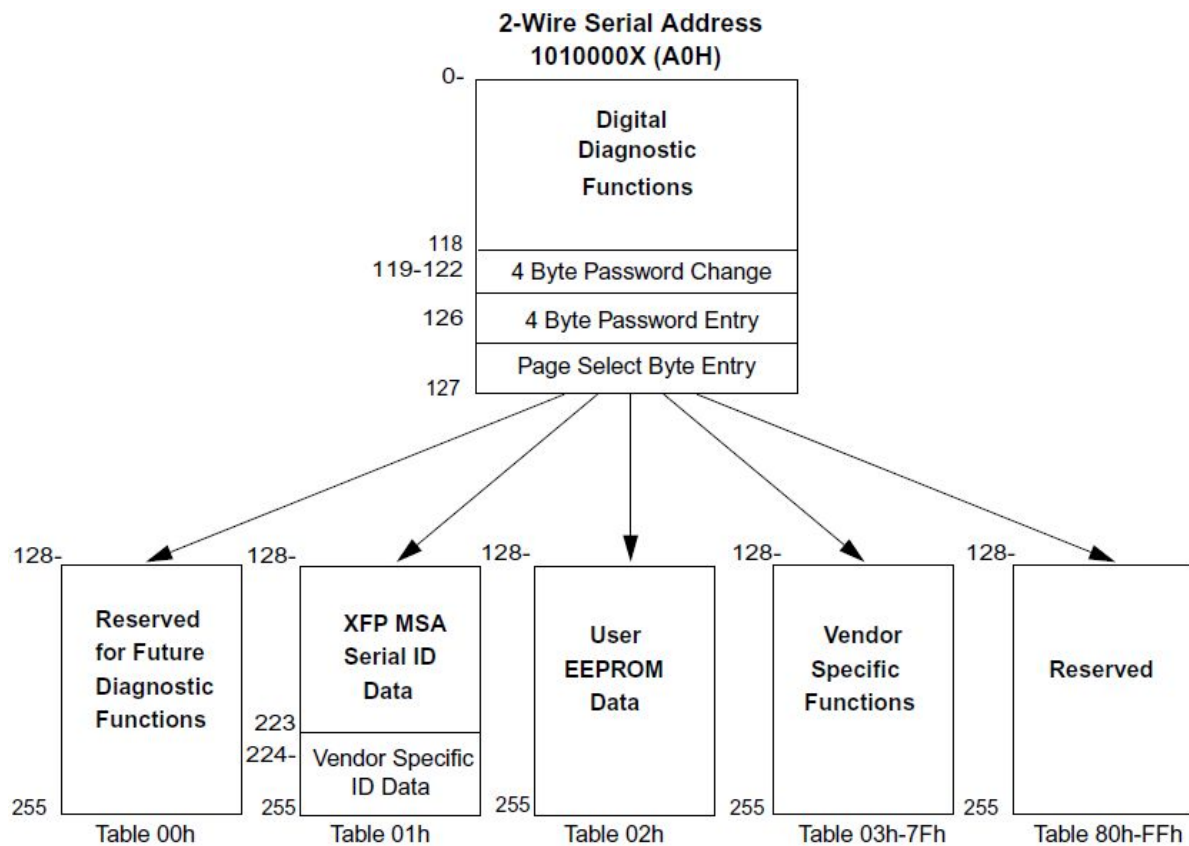


Figure 4, Memory Map



## XFP 10G Bi-Di Transceiver SOXPB-2399-20

### Mechanical Diagram

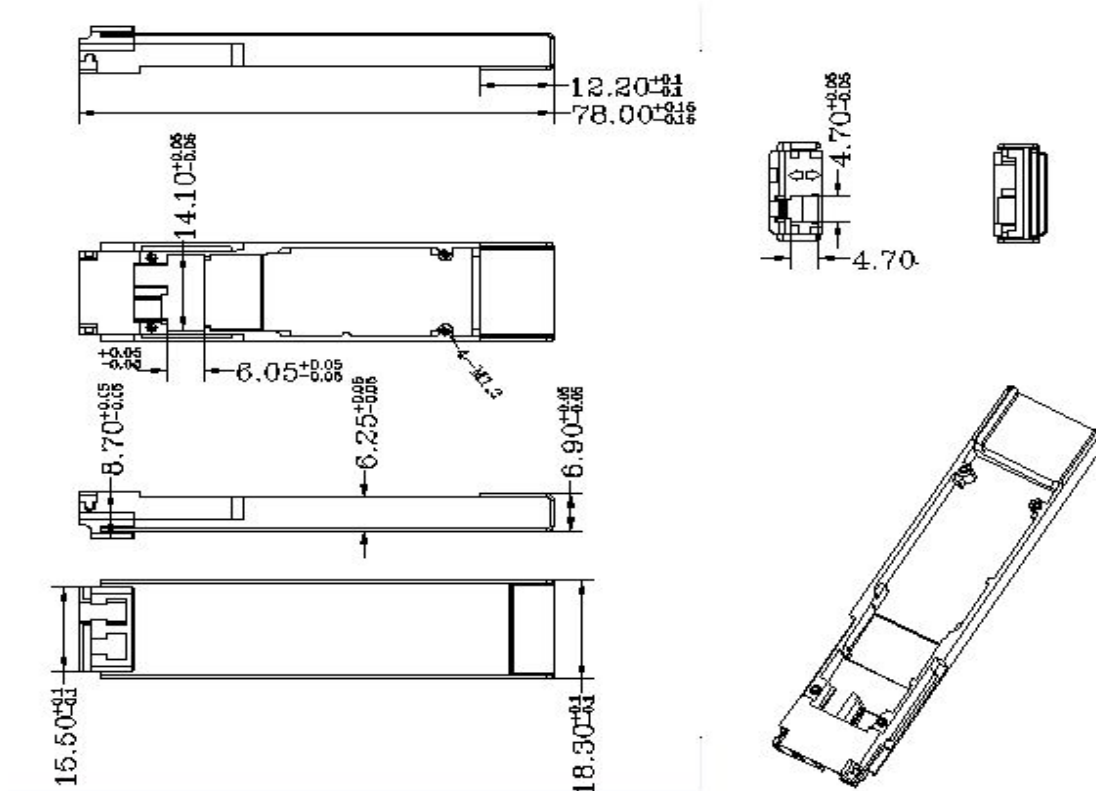


Figure 5, Mechanical Diagram

### Order Information

Table 6-Order Information

Part No.	Bit Rate (Gbps)	Laser TX(nm)	Laser RX(nm)	Fiber Type	Distance	Connector
SOXPB-2399-20	10.3125	1270	1330	SMF	10-20KM	Simplex LC Receptacle
SOXPB-3299-20	10.3125	1330	1270	SMF	10-20KM	Simplex LC Receptacle
SOXPB-2399-40	10.3125	1270	1330	SMF	20-40KM	Simplex LC Receptacle
SOXPB-3299-40	10.3125	1330	1270	SMF	20-40KM	Simplex LC Receptacle

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