

RoHS Compliant 10Gb/s 850nm XFP Optical Transceivers

Features

- Hot pluggable
- Support 9.95Gb/s to 11.1Gb/s bit rates
- Below 2.0 W power dissipation
- XFP MSA package with duplex LC connector
- Digital Diagnostic Monitor Interface
- Very low EMI and excellent ESD protection
- Uncooled 850nm VCSEL laser and PIN ROSA
- Up to 300M transmission on OM3 MMF
- operating temperature range 0°C to 70°C
- No reference clock requirement



Applications

- 10G BASE-SR Ethernet
- SONET OC-192/SDH STM-64 line card
- Other optical links

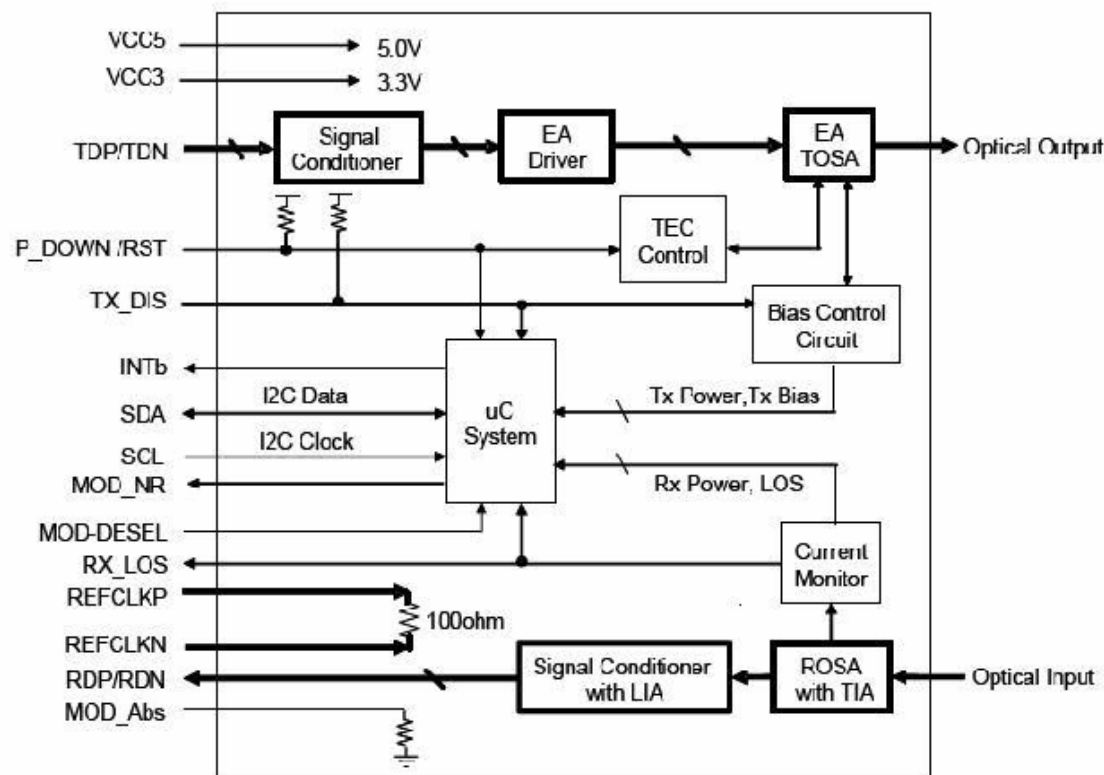
Standard

- XFP MSA compliant
- IEEE802.3ae-2002 compliant
- ITU-T G.959 and G.691 compliant
- GR-253-CORE compliant
- RoHS compliant

Description

- 10G 850nm XFP transceivers are designed for 10G Ethernet 10G BASE-SR per 802.3ae and 10G SONET OC-192/SDH STM-64, and it can support data-rate from 9.953Gb/s to 11.1Gb/s. Digital diagnostics are available via I2C interface as specified in the XFP MSA.
- The transceiver designs are optimized for high performance and cost effective to supply customers the best solutions for datacom and telecom applications.

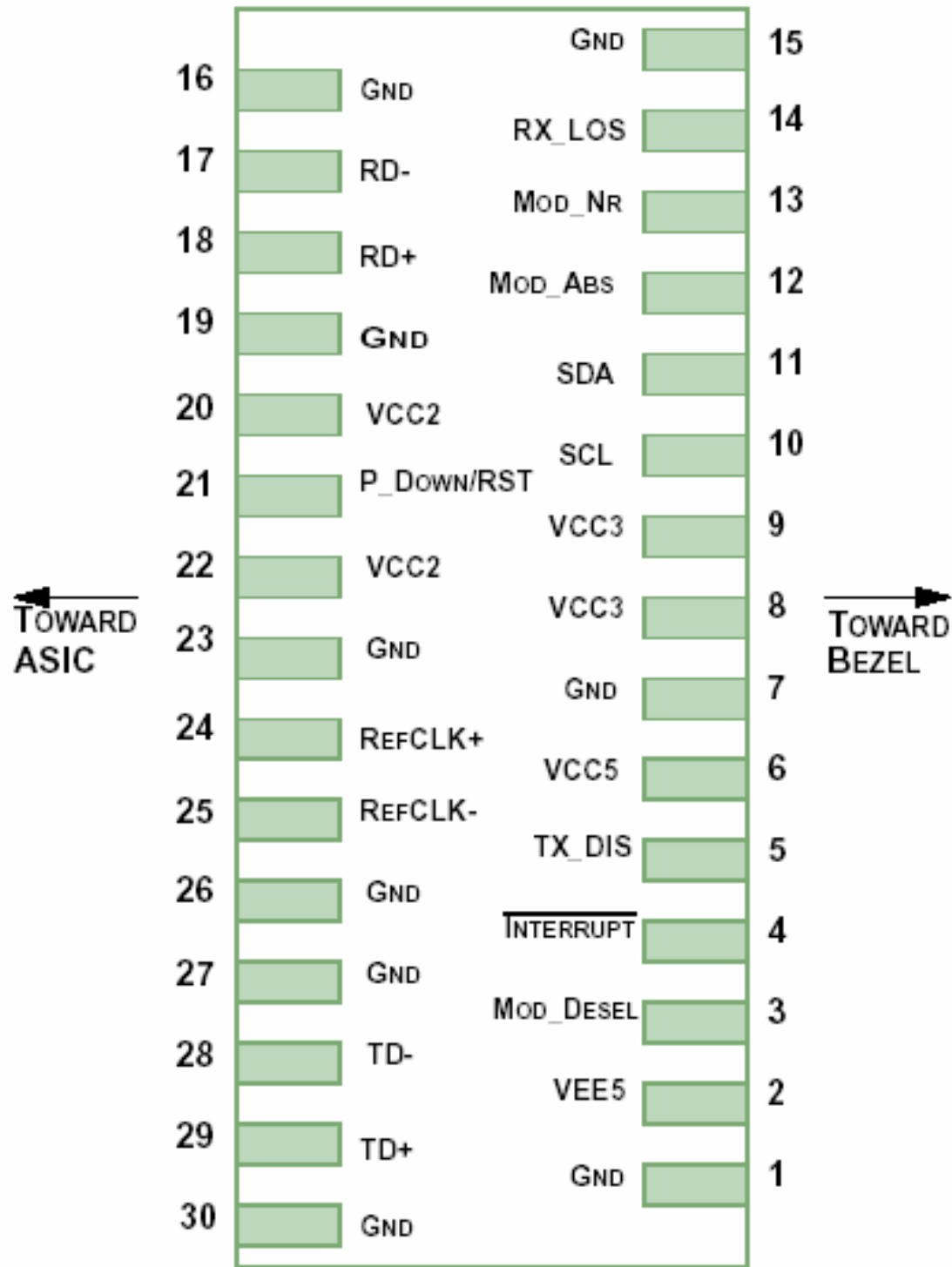
Functional Diagram



Pin Definitions

<i>in</i>	<i>Logic</i>	<i>Symbol</i>	<i>Name/Description</i>	<i>Note</i>
1		GND	Module Ground	1
2		VEE5	Optional -5.2V Power Supply	
3	LVTTTL-I	MOD_DESEL	Module De-select; When held low allows the module to respond to 2-wire serial interface	
4	LVTTTL-O	/INTERRUPT	Interrupt; Indicates presence of an important condition which can be read via the 2-wire serial interface	2
5	LVTTTL-I	TX_DIS	Transmitter Disable; Turns off transmitter laser output	
6		VCC5	+5V Power Supply	
7		GND	Module Ground	1
8		VCC3	+3.3V Power Supply	
9		VCC3	+3.3V Power Supply	
10	LVTTTL-I/O	SCL	2-Wire Serial Interface Clock	2
11	LVTTTL-I/O	SDA	2-Wire Serial Interface Data Line	2
12	LVTTTL-O	MOD_Abs	Indicates Module is not present. Grounded in the Module	2
13	LVTTTL-O	MOD_NR	Module Not Ready; Indicating Module Operational Fault	2
14	LVTTTL-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 required).	3
21	LVTTTL-I	P_DOWN/RST	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		V _{CC2}	+1.8V Power Supply (Not required)	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
28	CML-I	TD-	Transmitter Inverted Data Input	
29	CML-I	TD+	Transmitter Non-Inverted Data Input	
30		GND	Module Ground	1

1. Module ground pins GND are isolated from the module case and chassis ground within the module.
2. Open collector; Shall be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.6V on the host board.
3. The pins are open within module.
4. Reference Clock is not required.



Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T _s	-40	+85	°C
Power Supply Voltage	V _{CC3}	-0.5	4.0	V
	V _{CC5}	-0.5	6.0	V
Operating Relative Humidity	RH		85	%

Electrical Characteristics (T_{OP} = 0 to 70 °C)

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	T_C	0		+70	°C	
Power Supply Voltage	VCC3	3.13	3.3	3.47	V	
Power Supply Current	I_{CC3}			600	mA	1
Power Dissipation	P_D			2.0	W	1
Transmitter						
Input Differential Impedance	R_{input}		100		Ω	3
Differential Data Input Swing	$V_{in,pp}$	120		820	mV	
TX_DIS Voltage	V_{TX_DIS}	2.0		VCC3	V	4
TX_EN Voltage	V_{TX_EN}	0		0.8	V	
TX_DIS Assert Time				10	us	
TX_DIS Deassert Time				2	ms	
Receiver						
Differential Data Output Swing	$V_{out,pp}$	500	650	800	mV	5
Data output Rise/Fall Time(20%~80%)	t_r / t_f			50	ps	6

Note:

1. Maximum total power value is specified across the full temperature and voltage range and the inrush current is included
2. Per section 2.7.1 in the XFP MSA specification
3. After internal AC coupling
4. Or open collector
5. Into 100 Ω termination
6. 20% ~ 80%

Optical Characteristics (T_{OP} = 0 to 70 °C)

Transmitter (0~70°C@9.953Gb/s~11.1Gb/s)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Data Rate		9.95		11.1	Gb/s	
Ave. Output Power	P _o	-6		0	dBm	1
Output Centre Wavelength	λ	840	850	860	nm	
Disable Power	P _{off}			-30	dBm	
Extinction Ratio	ER	3.0			dB	1
Spectral Width	$\Delta \lambda$			1	nm	
Optical Modulation Amplitude	OMA	-5.2			dBm	2
Rise/Fall Time (20%~80%)	T _r /T _f			50	ps	
Dispersion penalty				1	dB	1
Generation Jitter 1(20KHZ-80MHZ)				0.15	Ulp-p	1
Generation Jitter 2(4MHZ-80MHZ)				0.08	Ulp-p	1
Optical Eye Mask 1		GR-253-CORE/ITU-T G.691				1
Optical Eye Mask 2		IEEE802.3ae				2

Receiver (0~70°C@9.953Gb/s~11.1Gb/s)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Data Rate		9.95		11.1	Gb/s	
Overload	P _o	-1			dBm	
Input Centre Wavelength	λ	840	850	860	nm	
Receiver Sensitivity	P _{min}			-10.0	dBm	1
Stressed Sensitivity in OMA				-11.1	dBm	2
LOS Assert	LosA	-25			dBm	
LOS De-assert	LosD			-11	dBm	
LOS Hysteresis		0.5		4	dB	
Optical Return Loss		14			dB	
Jitter Tolerance		GR-253-CORE/ITU-T G.783				1

Note :1. Measured at 9.95328Gb/s,Framed PRBS2^31-1,NRZ

2. Measured at 10.3125Gb/s,Non-framed PRBS2^31-1,NRZ

Management Interface

XFP 2-Wire Serial Interface Protocol

XFP 2-wire serial interface is specified in the Chapter 4 of the XFP MSA specification. The XFP 2-wire serial interface is used for serial ID, digital diagnostics, and certain control functions. The 2-wire serial interface is mandatory for all XFP modules. The 2-wire serial interface address of the XFP module is 1010000X(A0h). In order to access to multiple modules on the same 2-wire serial bus, the XFP has a MOD_DESEL(module deselect pin). This pin (which is pull high or deselected in the module) must be held low by the host to select of interest and allow communication over 2-wire serial interface. The module must not respond to or accept 2-wire serial bus instructions unless it is selected.

XFP Management Interface

XFP Management interface is specified in the Chapter 5 of the XFP MSA specification. The Figure 1 shows the structure of the memory map. The normal 256 Byte address space is divided into lower and upper blocks of 128 Bytes. The lower block of 128 Byte is always directly available and is used for the diagnostics and control functions that must be accessed repeatedly. Multiple blocks of memories are available in the upper 128 Bytes of the address space. These are individually addressed through a table select Byte which the user enters into a location in the lower address space. The upper address space tables are used for less frequently accessed functions and control space for future standards definition.

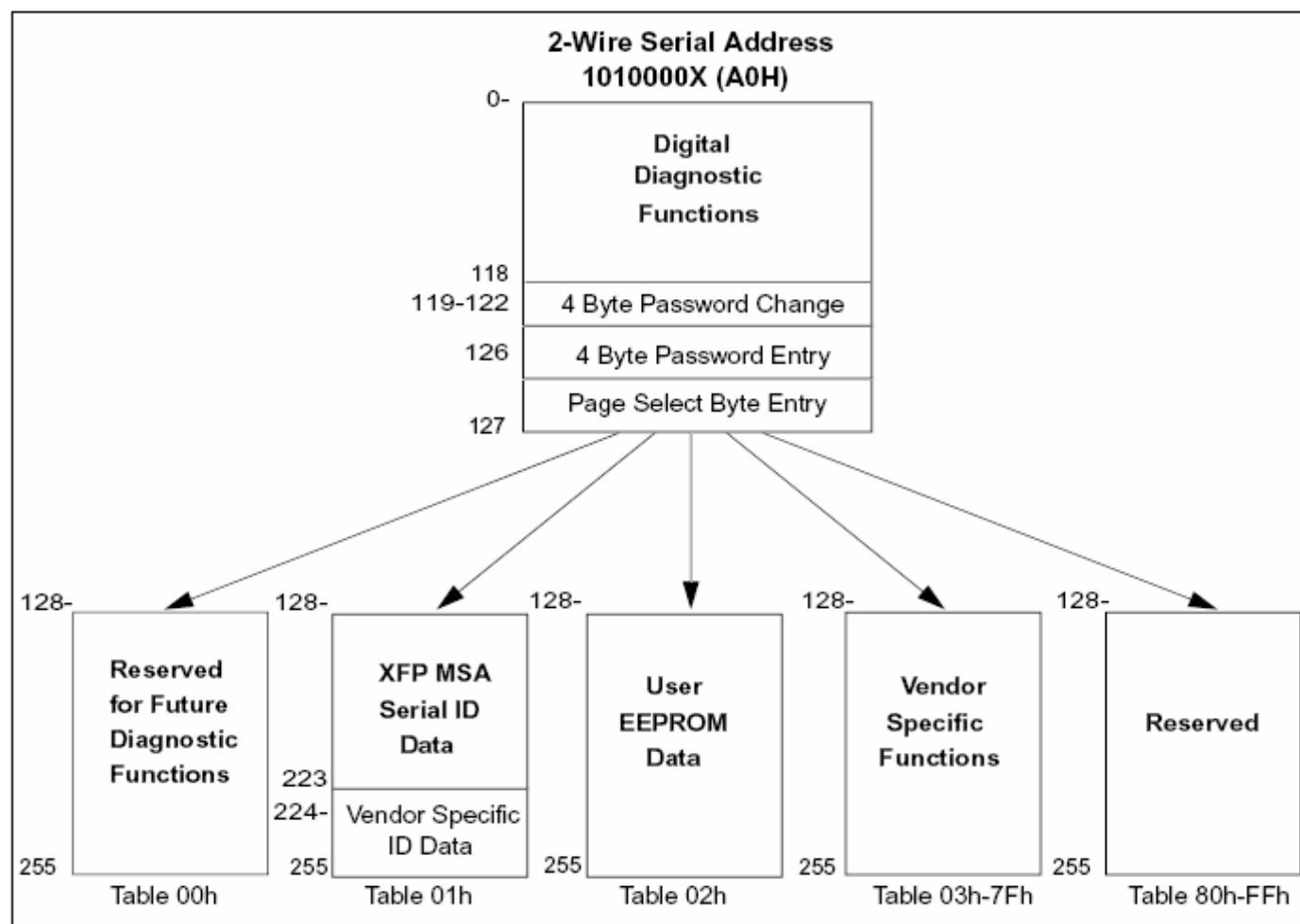
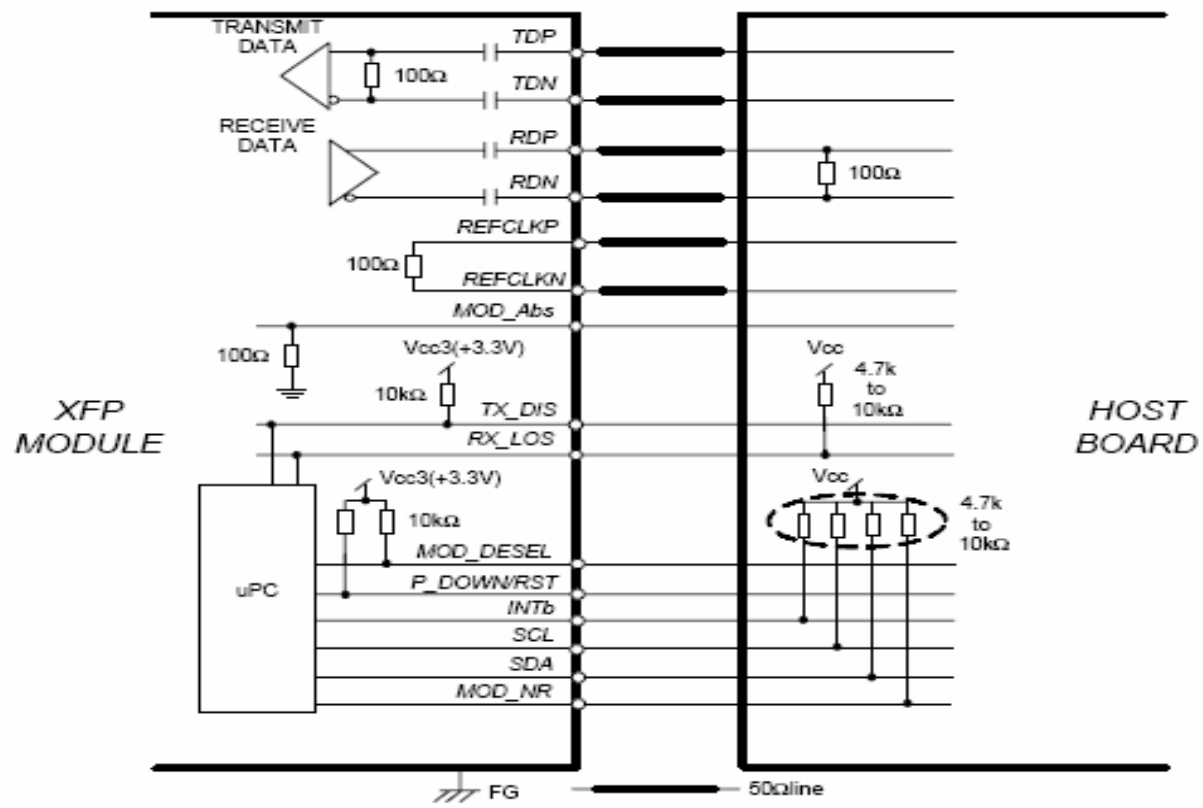
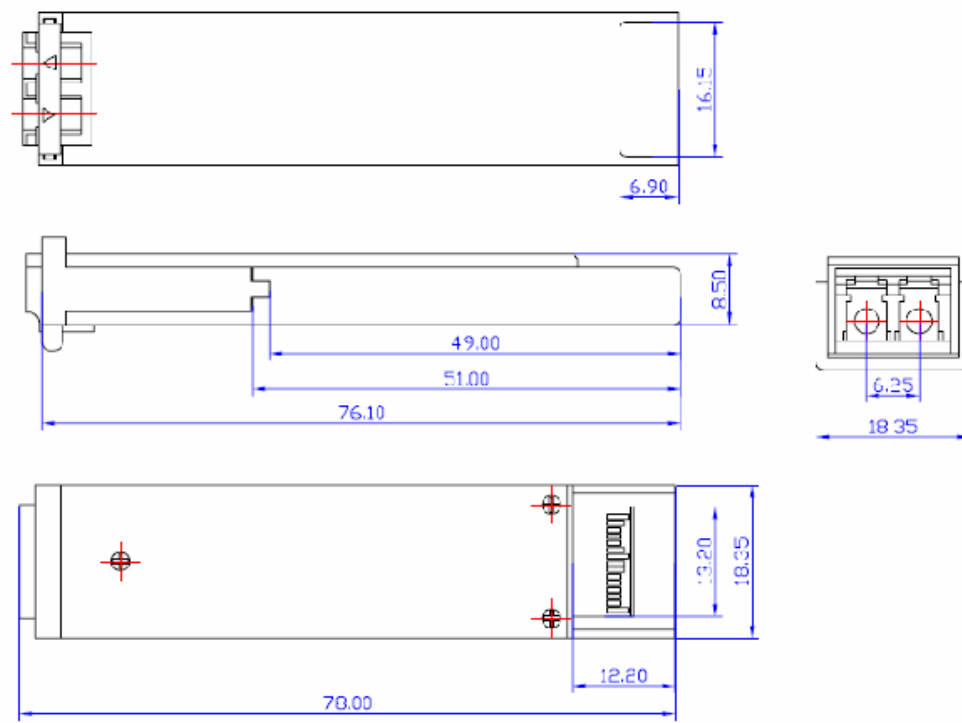


Figure 1 :2-wire Serial Interface Memory Map

Typical Interface Circuit



Package Dimensions



Obtaining Document

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Ordering Information

产品型号	速率	传输距离	波长	激光器	光功率	灵敏度	电压	接口	DDMI
XFP-10G-SR	10Gbps	300m	850nm	VCSEL	-7.3~-1dbm	-11dbm	3.3V	LC	Y
XFP-10G-LR	10Gbps	10km	1310nm	FP	-8.2~-0.5dbm	-13dbm	3.3V	LC	Y
XFP-10G-ER	10Gbps	40km	1550nm	DFB	-5~+4.5dbm	-16dbm	3.3V	LC	Y
XFP-10G-ZR	10Gbps	80km	1550nm	DFB	0~+5dbm	-16dbm	3.3V	LC	Y