



Modulelink(Shenzhen) Technology Co., Ltd.

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Optical network solutions provider

XFP 10G Transceiver M10GB-XFP-LR

PRODUCT FEATURES

- Supports 9.95Gb/s to 10.5Gb/s bit rates
- Power dissipation <2.0W
- Commercial temperature range: -5°C to 75°C
- RoHS-6 Compliant (lead-free)
- Hot-pluggable XFP footprint
- Single power supply: 3.3V
- Maximum link length of 10km
- Uncooled 1310nm DFB laser
- Full Duplex LC connector
- No Reference Clock required
- Built-in digital diagnostic functions
- Standard bail release mechanism

APPLICATIONS

- 10GBASE-LR/LW 10G Ethernet
- 1200-SM-LL-L 10G Fibre Channe

Modulelink's M10GB-XFP-LR Small Form Factor 10Gb/s (XFP) transceivers are compliant with the current XFP Multi-Source Agreement (MSA) Specification¹. They comply with 10-Gigabit Ethernet 10GBASE-LR/LW per IEEE 802.3ae and 10G Fibre Channel 1200-SM-LL-L. Digital diagnostics functions are available via a 2-wire serial interface, as specified in the XFP MSA. The transceiver is RoHS compliant and lead free per Directive 2002/95/EC³.

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PRODUCT SELECTION

I. Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit
Maximum Supply Voltage	Vcc3	-0.5		4.0	V
Storage Temperature	T _s	-40		85	°C
Case Operating Temperature	T _{OP}	-5		75	°C

II. Electrical Characteristics (T_{OP} = -5 to 75 °C, V_{CC3} = 3.13 to 3.45 Volts)

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	Vcc3	3.13		3.45	V
Supply Current	Icc3			600	mA
Module total power	P			2.0	W
Transmitter					
Input differential impedance	R _{in}		100		Ω
Differential data input swing	V _{in,pp}	120		820	mV
Transmit Disable Voltage	V _D	2.0		Vcc	V
Transmit Enable Voltage	V _{EN}	GND		GND+ 0.8	V
Transmit Disable Assert Time				10	us
Receiver					
Differential data output swing	V _{out,pp}	340	650	850	mV
Data output rise time	t _r			38	ps
Data output fall time	t _f			38	ps
LOS Fault	V _{LOS fault}	Vcc – 0.5		Vcc _{HOST}	V
LOS Normal	V _{LOS norm}	GND		GND+0.5	V
Power Supply Rejection		PSR			See Note 7 below

Notes:

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1. Maximum total power value is specified across the full temperature and voltage range.
2. After internal AC coupling.
3. Or open circuit.
4. Into 100 ohms differential termination.
5. 20 – 80 %
6. Loss Of Signal is open collector to be pulled up with a 4.7k – 10kohm resistor to 3.15 – 3.6V. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
7. Per Section 2.7.1. in the XFP MSA Specification .

III. Optical Characteristics ($T_{OP} = -5$ to 75 °C, $V_{CC3} = 3.13$ to 3.45 Volts)

Parameter	Symbol	Min	Typ	Max	Unit
Transmitter					
Average Optical Power	P_f	-5.0		0.5	dBm
Optical Wavelength	λ	1290	1310	1330	nm
Sidemode Supression ratio	SSR_{min}	30			dB
Optical Extinction Ratio	ER	3.5			dB
Transmitter and Dispersion Penalty	TDP			3.2	dB
Average Launch power of OFF transmitter	P_{OFF}			-30	dBm
Tx Jitter			Tx		Per 802.3ae requirements
Relative Intensity Noise	RIN			-130	dB/Hz
Receiver					
Receiver Sensitivity	R_{SENS}			-14.4	dBm
Maximum Input Power	P_{MAX}	+0.5			dBm
Optical Center Wavelength	λ_C	1260		1600	nm
Receiver Reflectance	R_{rx}			-12	dB
LOS De-Assert	LOS_D			-18	dBm
LOS Assert	LOS_A	-32			dBm
LOS Hysteresis		0.5			dB

Notes:

1. Measured with worst ER; $BER < 10^{-12}$; $2^{31} - 1$ PRBS.
2. Per IEEE 802.3ae. Equivalent to -13.3 dBm average power at Infinite ER.

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IV. General Specifications

Parameter	Symbol	Min	Typ	Max	Units
Bit Rate	BR	9.95		10.5	Gb/s
Bit Error Ratio	BER			10^{-12}	
Max. Supported Link Length	L_{MAX}		10		km

Notes:

- 10GBASE-LR/LW, 1200-SM-LL-L.
- Tested with a $2^{31} - 1$ PRBS

V. Environmental Specifications

Modulelink M10GB-XFP-LR transceivers have a commercial operating case temperature range of -5°C to +75 °C.

Parameter	Symbol	Min	Typ	Max	Units
Case Operating Temperature	T_{op}	-5		75	°C
Storage Temperature	T_{sto}	-40		85	°C

Relative Humidity 5 - 85 %

Class 1 Laser Product EN 60825-1 Compliance

VI. Digital Diagnostic Functions

As defined by the XFP MSA¹, Modulelink XFP transceivers provide digital diagnostic functions via a 2-wire serial interface, which allows real-time access to the following operating parameters:

- Transceiver temperature
- Laser bias current
- Transmitted optical power
- Received optical power
- Transceiver supply voltage

It also provides a sophisticated system of alarm and warning flags, which may be used to alert end-users when particular operating parameters are outside of a factory-set normal range.

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through the 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL pin) is generated by the host. The positive edge

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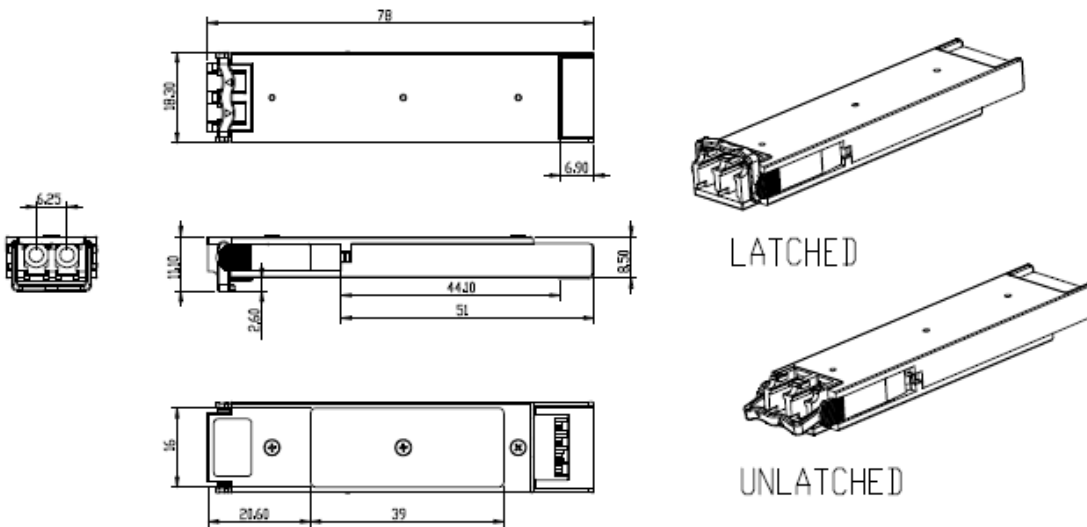
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clocks data into the XFP transceiver into those segments of its memory map that are not write-protected. The negative edge clocks data from the XFP transceiver. The serial data signal (SDA pin) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially. The 2-wire serial interface provides sequential or random access to the 8 bit parameters, addressed from 000h to the maximum address of the memory.

VII. Mechanical Specifications

Modulelink's XFP transceivers are compliant with the dimensions defined by the XFP Multi-Sourcing Agreement (MSA).

XFP Transceiver (dimensions are in mm)



VIII. PCB Layout and Bezel Recommendations

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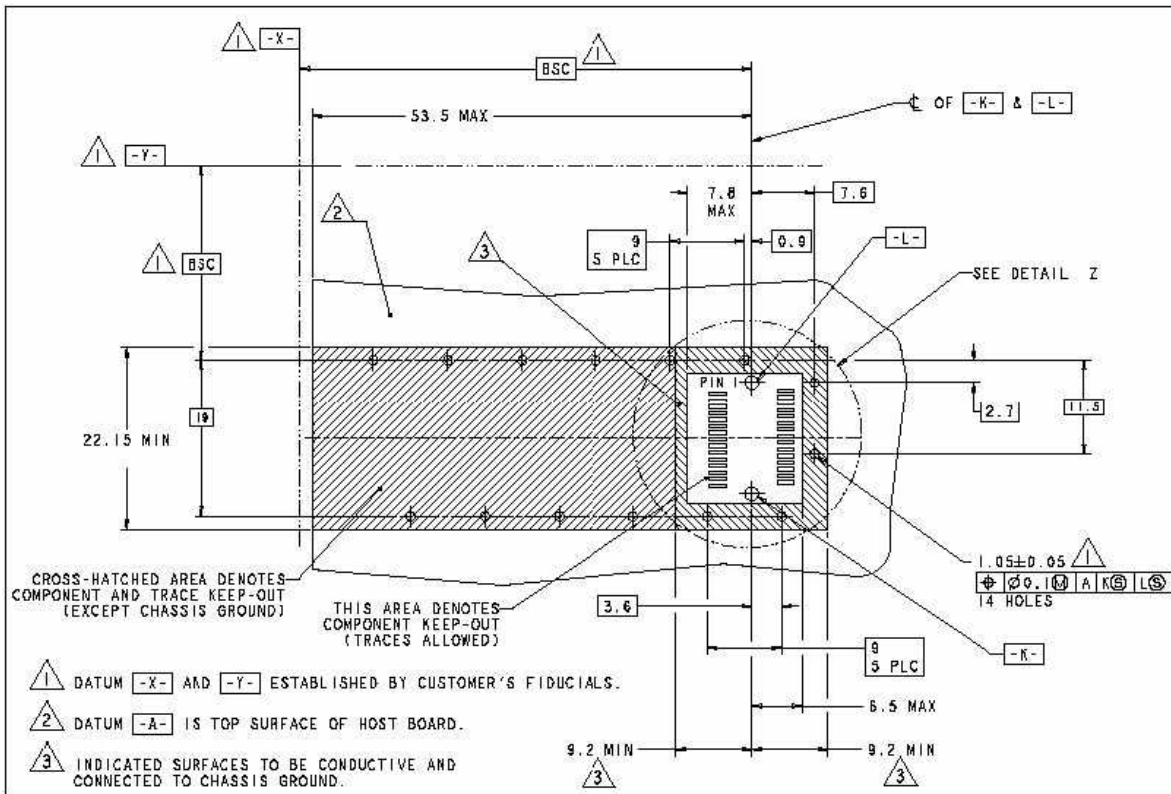
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XFP Host Board Mechanical Layout (dimensions are in mm)

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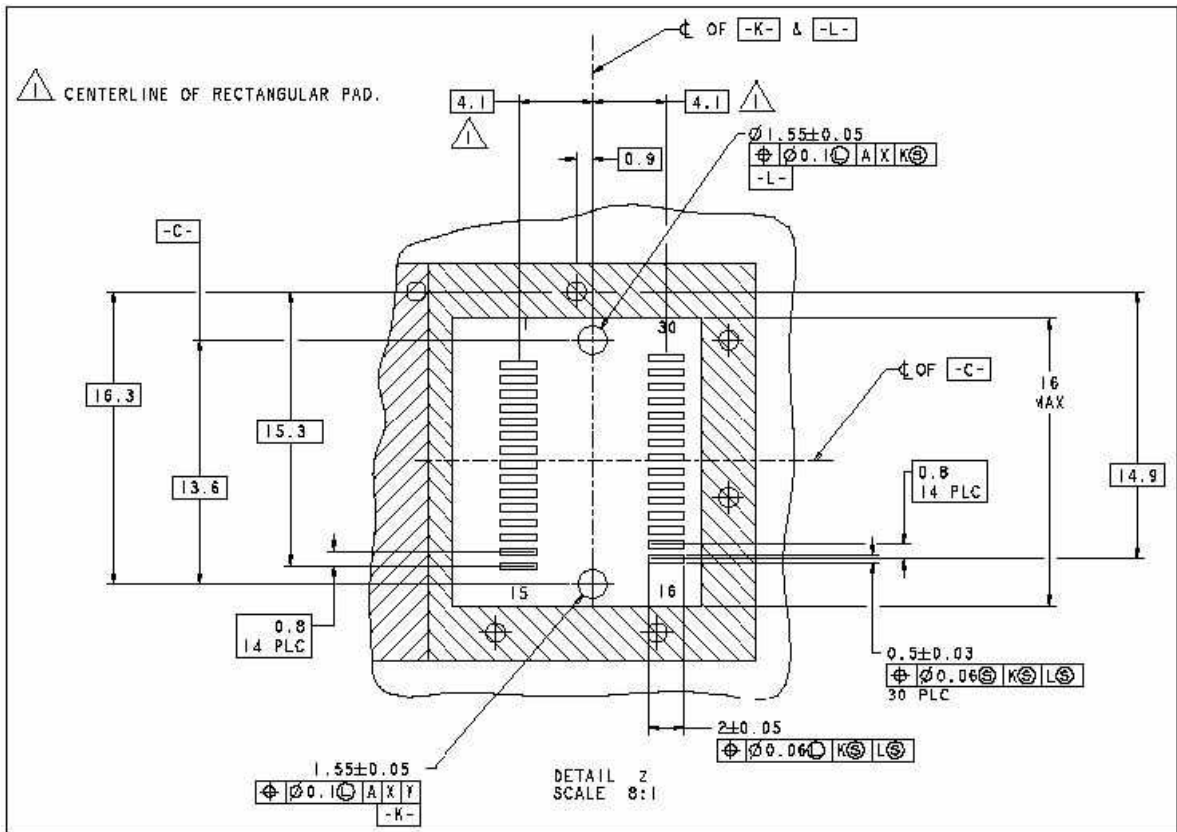
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XFP Detail Host Board Mechanical Layout (dimensions are in mm)

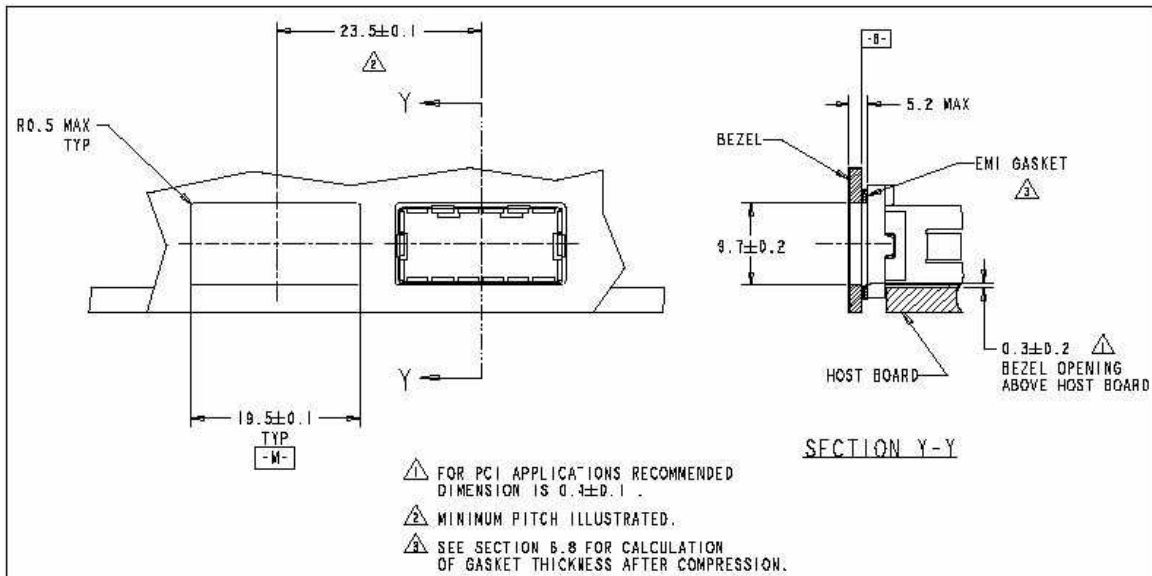
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