

# 10Gbps XFP Optical Transceiver RTX226-6XX



The RTX226-6XX is a hot pluggable 10Gbps small-form-factor transceiver module integrated with the high performance cooled DWDM EML transmitter and high sensitivity APD receiver. It is compliant to INF-8077i XFP Multi-source Agreement(MSA). The module is a multirate optical transceiver, intended to support Telecom and Datacom applications.

## Features

- Data rate from 9.95 Gbps to 11.3Gbps
- DWDM EML TOSA and APD ROSA
- Industry-standard, protocol-independent, XFI interface
- Transmission distance up to 80km
- LC duplex receptacle package
- Hot pluggable
- Built in digital diagnostic functions
- Operating case temperature range:-5°C~70°C
- RoHS compliant

## Applications

- SONET OC-192&SDH STM 64
- 10Gigabit Ethernet
- 10Gigabit Fiber Channel

## Standards

- XFP MSA (INF-8077i)
- IEEE802.3ae
- ITU-T G.691

## Specifications

(Tested under recommended operating conditions, unless otherwise noted)

Parameter	Symbol	Unit	Value		
			Min	Typ	Max
Optical Transmitter Characteristics					
Data Rate	-	Gbps	9.95	-	11.3
Optical Power	P <sub>0</sub>	dBm	0	-	4
Center Wavelength Range	λ <sub>c</sub>	nm	1528.77	-	1563.05
Center Wavelength Spacing		GHz		100	
Wavelength Tolerance		pm	-50		+50
Extinction Ratio	ER	dB	9	-	-
Spectral Width (-20dB)	Δλ	nm	-	-	0.4
SMSR	-	dB	30	-	-
Relative Intensity Noise	RIN	dB/Hz	-	-	-128
Eye Diagram	Compliant with ITU-T G.691				
Dispersion Penalty <sup>1 2</sup>	-	dB	-	-	2
Optical Receiver Characteristics					
Data Rate	-	Gbps	9.95	-	11.3
Center Wavelength Range	λ <sub>c</sub>	nm	1260	-	1620
Receiver Sensitivity <sup>2</sup>	S	dBm	-	-	-24
Overload Input Optical Power	-	dBm	-7	-	-
Receiver Reflectance	-	dB	-	-	-30
LOS	Optical Dessert	dBm	-	-	-27
	Optical Assert		-	-	-
LOS Hysteresis	-	dB	0.5	-	6
Note1: 80KmSMF,9.95Gbps					
Note2:Ber<10 <sup>-12</sup> ,2 <sup>31</sup> -1 PRBS NRZ,DWDM,ER=9dB					

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## Ordering Information

Part No.	Specifications								
	Package	Data rate	Laser	Optical Power	Detector	Sensitivity	Top	Reach	Others
RTXM226-6XX	XFP	10G	DWDM EML	0 ~ 4dBm	APD	<-24dBm	-5~70°C	80km	DDM,RoHS

## Absolute Maximum Ratings

Parameter	Symbol	Unit	Min	Max
Supply Voltage 1	V <sub>CC3</sub>	V	-0.5	4.0
Supply Voltage 2	V <sub>CC5</sub>	V	-0.5	6.0
Storage Temperature	T <sub>s</sub>	°C	-40	85
Operating Case Temperature	T <sub>c</sub>	°C	-5	70
Relative Humidity (Non condensation)	-	%	5	90

## Recommended Operating Conditions

Parameter	Symbol	Unit	Min	Typ	Max
Operating Case Temperature	T <sub>c</sub>	°C	-5	-	70
Supply Voltage 1	V <sub>CC3</sub>	V	3.13	3.3	3.47
Supply Current 1	I <sub>CC3</sub>	mA	-	-	750
Supply Voltage 2	V <sub>CC5</sub>	V	4.75	5.0	5.25
Supply Current 2	I <sub>CC5</sub>	mA	-	-	500
Power Dissipation	-	W	-	-	3.5

## Electrical Characteristics

(Tested under recommended operating conditions, unless otherwise noted)

Parameter	Symbol	Unit	Min	Typ	Max	Note
<b>Transmitter</b>						
Input Differential Impedance	R <sub>in</sub>	Ω	-	100	-	
Differential Data Input Swing	V <sub>in,pp</sub>	mV	120	-	1000	
Transmit Disable Voltage	V <sub>D</sub>	V	2.0	-	V <sub>CC3</sub>	
Transmit Enable Voltage	V <sub>EN</sub>	V	0	-	+0.8	
Transmit Disable Assert Time	-	μs	-	-	10	
<b>Receiver</b>						
Differential Data Output Swing	V <sub>out,pp</sub>	mV	400	-	800	
Data Output Rise Time	T <sub>r</sub>	ps	24	-	-	
Data Output Fall Time	T <sub>f</sub>	ps	24	-	-	
LOS Fault	-	V	V <sub>DD3</sub> -0.5	-	V <sub>DD3</sub>	1
LOS Normal	-	V	0	-	+0.8	

Note1: V<sub>DD3</sub> is host +3.3V power supply.

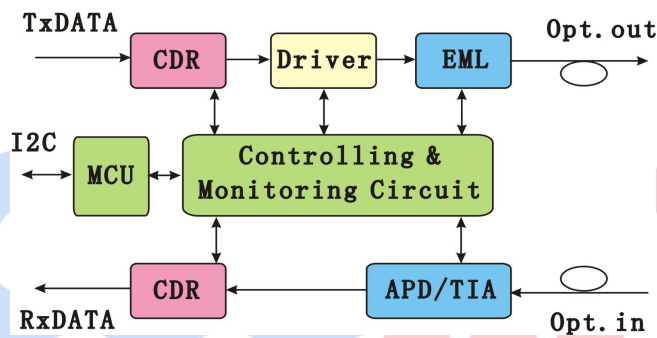
# 10Gbps XFP Optical Transceiver RTX226-6XX

## Low Speed Electrical Interface

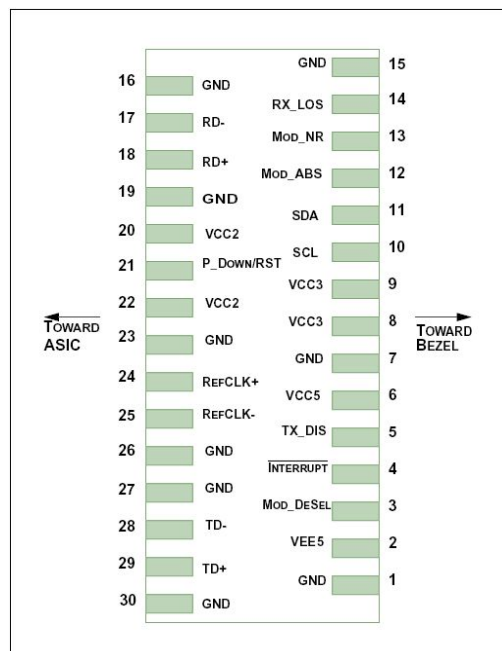
Parameter	Symbol	Unit	Min	Max	Note
XFP Tx_Dis,P_Down/RST	$V_{IH}$	V	2.0	$V_{cc3}+0.3$	
	$V_{IL}$	V	-0.3	0.8	
XFP Interrupt,Mod_NR,Rx_Los	$V_{OH}$	V	$V_{dd3}-0.5$	$V_{dd3}+0.3$	1
	$V_{OL}$	V	0.0	0.4	
XFP SCL and SDA Input	$V_{IH}$	V	$V_{dd3}*0.7$	$V_{dd3}+0.5$	1
	$V_{IL}$	V	-0.3	$V_{dd3}*0.3$	
XFP SCL and SDA Output	$V_{OH}$	V	$V_{dd3}-0.5$	$V_{dd3}+0.3$	
	$V_{OL}$	V	0.0	0.4	
Leakage Current	$I_L$	$\mu A$	-10	10	
I <sup>2</sup> C Clock Rate		KHz		400	

Note1:  $V_{dd3}$  is host +3.3V power supply.

## Block Diagram



## Pin Description



Pin	Logic	Symbol	Name/Description	Note
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# 10Gbps XFP Optical Transceiver RTX226-6XX

1		GND	Module Ground	1
2		VEE5	Optional -5.2V Power Supply (Not Required)	
3	LVTTTL-I	Mod_DeSel	Module De-select; When held low allows module to respond to 2-wire serial interface	
4	LVTTTL-O	Interrupt	Interrupt; Indicates presence of an important condition which can be read over 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	I/O	SCL	2-Wire Serial Interface Clock	2
11	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)	
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		VCC2	+1.8V Power Supply (Not Required)	
23		GND	Module Ground	1
24	PECL-I	RefCLK+	Reference Clock Non-Inverted Input, AC coupled on the host board (Not Required)	
25	PECL-I	RefCLK-	Reference Clock Inverted Input, AC coupled on the host board (Not Required)	
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

Note1: Module ground pins GND are isolated from the module case and chassis ground within the module.

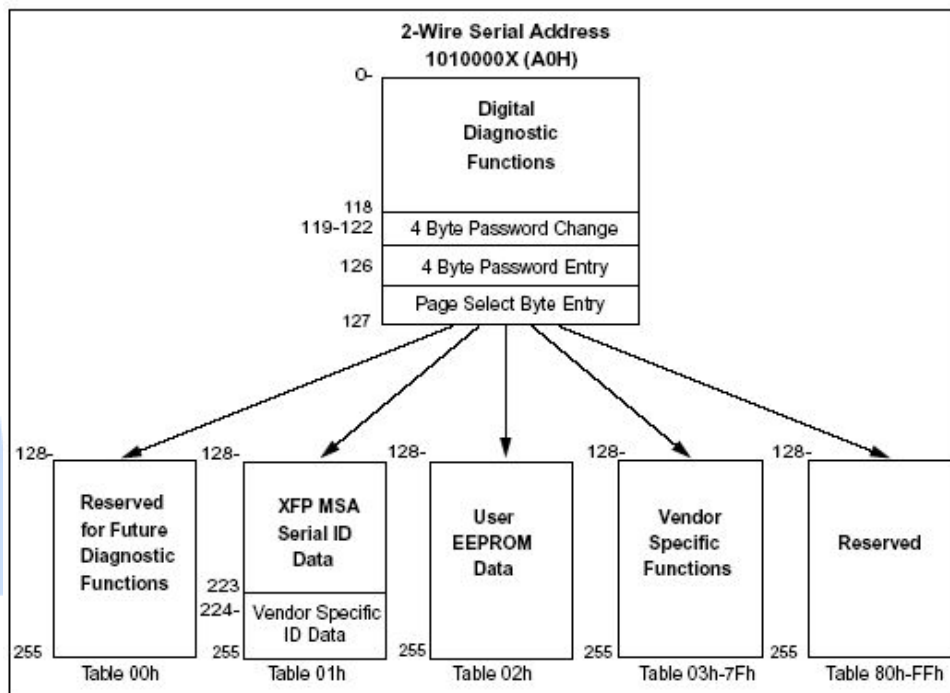
Note2: Shall be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.45V on the host board.

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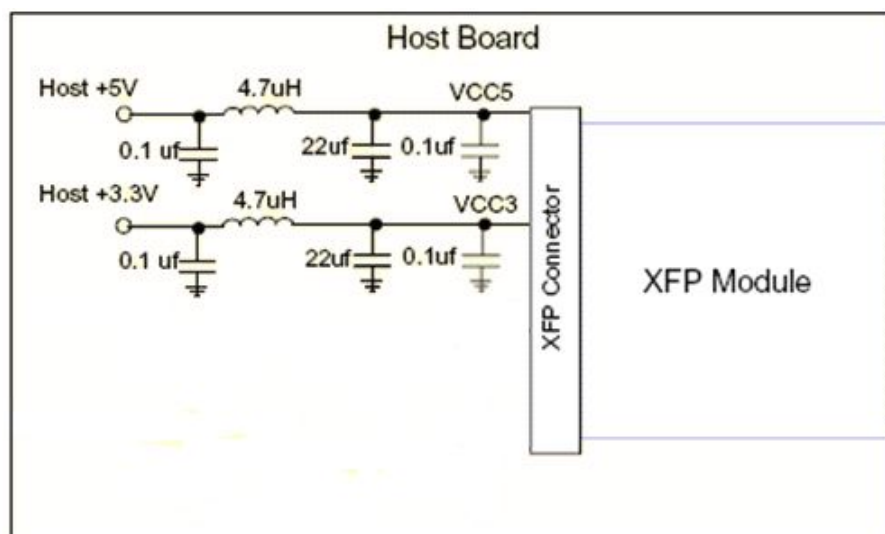
## Digital Diagnostic Functions

As defined by the XFP MSA, digital diagnostic functions are provided via a 2-wire serial interface, which allows real-time access to the following operating parameters:

- Transceiver Temperature
- Tx Bias Current
- Tx Optical Power
- RX Received Optical Power
- Transceiver +3.3V Supply Voltage
- Laser Temperature

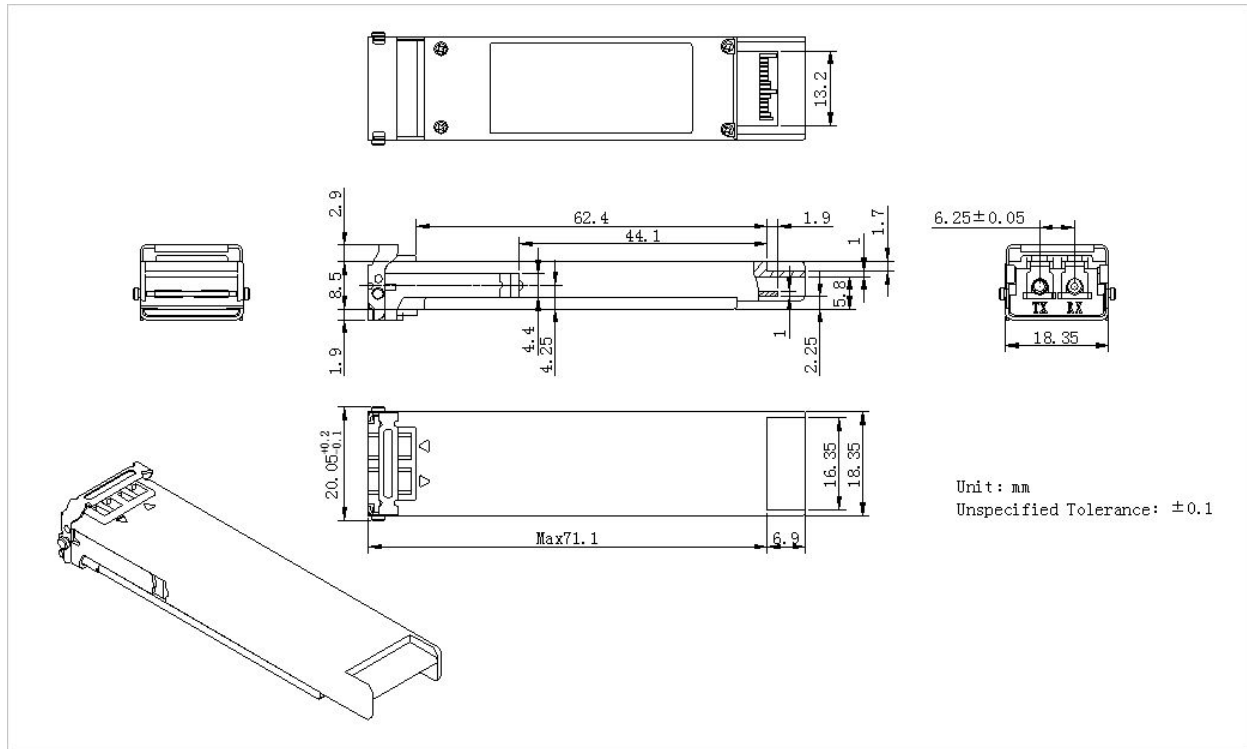


## Typical Application Circuit for Power Supply



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## Package Outline



## Regulatory Compliance

Feature	Test Method	Performance
Laser Eye Safety	FDA 21 CFR 1040.10 and 1040.11 IEC 60825-1: 1994+ A11: 1996+ A2: 2001 IEC 60825-2: 2004 + A1: 2006 EN 60825-1:1994+A1:2002+A2:2001 EN 60825-2: 2004	Compliant with Class 1 laser product
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7 Human Body Model	Class 1 (>1.5kV)
Electrostatic Discharge (ESD) Immunity	IEC 61000-4-2: 2001	Class 2 (>4.0kV)
Electromagnetic Interference (EMI)	FCC Part 15 Subpart J Class B CISPR22:1997+A1:2000+A2:2002, Class B EN55022:1998+A1:2000+A2:2003, Class B	Compliant with standards

Product Code	Frequency(THz)	Center Wavelength(nm)
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# 10Gbps XFP Optical Transceiver RTX226-6XX

RTXM226-618	191.8	1563.05
RTXM226-619	191.9	1562.23
RTXM226-620	192.0	1561.42
RTXM226-621	192.1	1560.61
RTXM226-622	192.2	1559.79
RTXM226-623	192.3	1558.98
RTXM226-624	192.4	1558.17
RTXM226-625	192.5	1557.36
RTXM226-626	192.6	1556.55
RTXM226-627	192.7	1555.75
RTXM226-628	192.8	1554.94
RTXM226-629	192.9	1554.13
RTXM226-630	193.0	1553.33
RTXM226-631	193.1	1552.52
RTXM226-632	193.2	1551.72
RTXM226-633	193.3	1550.92
RTXM226-634	193.4	1550.12
RTXM226-635	193.5	1549.32
RTXM226-636	193.6	1548.51
RTXM226-637	193.7	1547.72
RTXM226-638	193.8	1546.92
RTXM226-639	193.9	1546.12
RTXM226-640	194.0	1545.32
RTXM226-641	194.1	1544.53
RTXM226-642	194.2	1543.73
RTXM226-643	194.3	1542.94
RTXM226-644	194.4	1542.14
RTXM226-645	194.5	1541.35
RTXM226-646	194.6	1540.56
RTXM226-647	194.7	1539.77
RTXM226-648	194.8	1538.98
RTXM226-649	194.9	1538.19
RTXM226-650	195.0	1537.40
RTXM226-651	195.1	1536.61
RTXM226-652	195.2	1535.82
RTXM226-653	195.3	1535.04
RTXM226-654	195.4	1534.25
RTXM226-655	195.5	1533.47
RTXM226-656	195.6	1532.68
RTXM226-657	195.7	1531.90
RTXM226-658	195.8	1531.12
RTXM226-659	195.9	1530.33

# 10Gbps XFP Optical Transceiver RTX226-6XX

RTXM226-660	196.0	1529.55
RTXM226-661	196.1	1528.77

**Accelink**