10Gbps XFP Optical Transceiver RTXM226-6XX

The RTXM226-6XX 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_0	dBm	0	-	4
Center Wavelength Range		λc	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/H_z	-	-	-128
Eye Diagram		Compliant with ITU-T G.691				
Dispersion Penalty[1 2]		-	dB	-	-	2
Optical Receiver Characteristics						
Data Rate		-	Gbps	9.95	-	11.3
Center Wavelength Range		λc	nm	1260	-	1620
Receiver Sensitivity[2]		S	dBm	-	-	-24
Overload Input Optical Power		-	dBm	-7	-	-
Receiver Reflectance		-	dB	-	-	-30
LOS	Optical Dessert	-	dBm	-	-	-27
	Optical Assert	-		-37	-	-
LOS Hysteresis		-	dB	0.5	-	6

Note1: 80KmSMF,9.95Gbps

Note2:Ber<10^{-12},2^{31}-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_{CC3}	V	-0.5	4.0
Supply Voltage 2	Vcc5	V	-0.5	6.0
Storage Temperature	T_s	°C	-40	85
Operating Case Temperature	T_c	°C	-5	70
Relative Humidity (Non condensation)	-	%	5	90

Recommended Operating Conditions

Parameter	**Symbol**	**Unit**	**Min**	**Typ**	**Max**
Operating Case Temperature	T_C	°C	-5	-	70
Supply Voltage 1	VCC3	V	3.13	3.3	3.47
Supply Current 1	ICC3	mA	-	-	750
Supply Voltage 2	VCC5	V	4.75	5.0	5.25
Supply Current 2	ICC5	mA	-	-	500
Power Dissipation	-	W	-	-	3.5

Electrical Characteristics

(Tested under recommended operating conditions, unless otherwise noted)

Parameter	**Symbol**	**Unit**	**Min**	**Typ**	**Max**	**Note**
Transmitter						
Input Differential Impedance	Rin	Ω	-	100	-	
Differential Data Input Swing	Vin,pp	mV	120	-	1000	
Transmit Disable Voltage	VD	V	2.0	-	V_{cc3}	
Transmit Enable Voltage	VEN	V	0	-	+0.8	
Transmit Disable Assert Time	-	μs	-	-	10	
Receiver						
Differential Data Output Swing	Vout,pp	mV	400	-	800	
Data Output Rise Time	Tr	ps	24	-	-	
Data Output Fall Time	Tf	ps	24	-	-	
LOS Fault	-	V	V_{dd3}-0.5	-	V_{dd3}	1
LOS Normal	-	V	0	-	+0.8	
Note1: V_{dd3} is host +3.3V power supply.						

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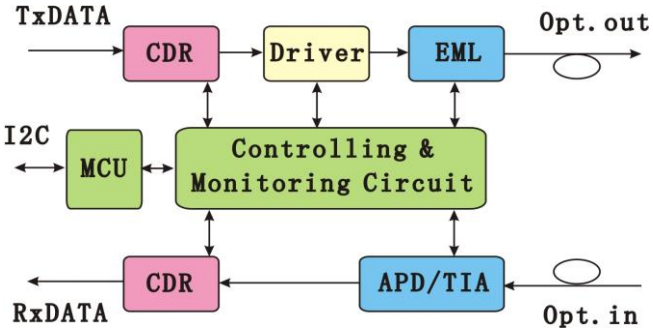
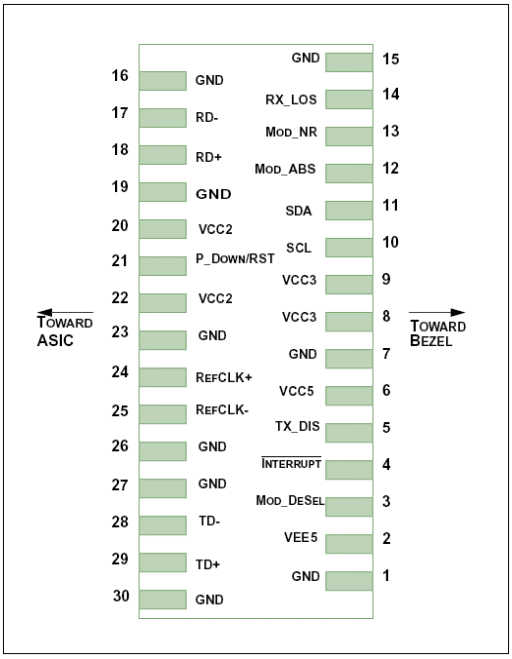
Low Speed Electrical Interface

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	
	V_{IL}	V	-0.3	V_{dd3}*0.3	1
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	μA	-10	10	
I^2C 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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1		GND	Module Ground	1
2		VEE5	Optional -5.2V Power Supply (Not Required)	
3	LVTTL-I	Mod_DeSel	Module De-select; When held low allows module to respond to 2-wire serial interface	
4	LVTTL-O	$\overline{\text{Interrupt}}$	$\overline{\text{Interrupt}}$; 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	
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	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 Required)	
21	LVTTL-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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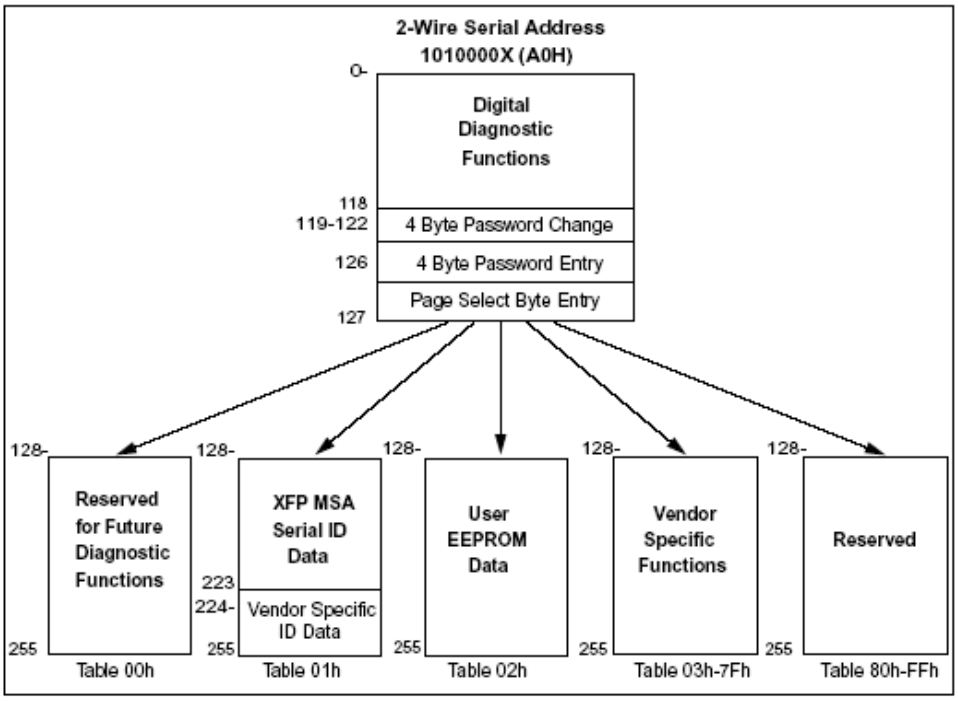
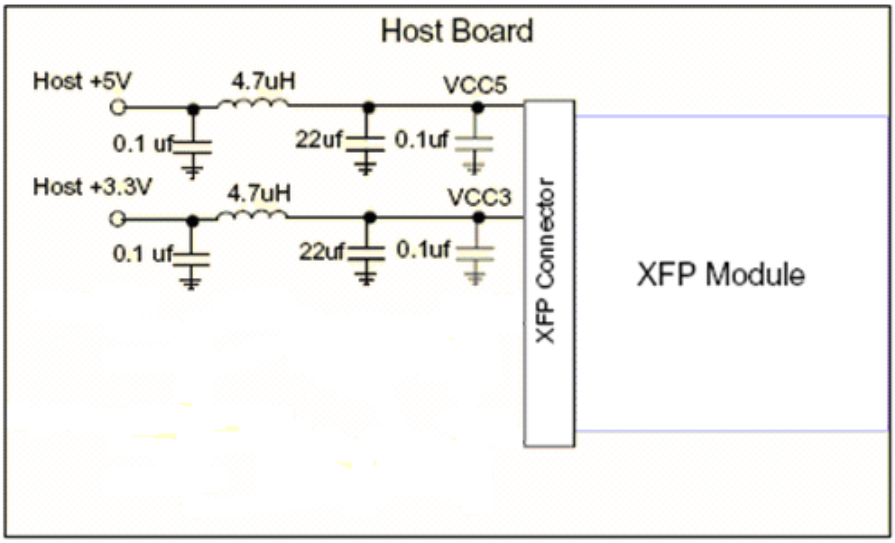
Digital Diagnostic Functions

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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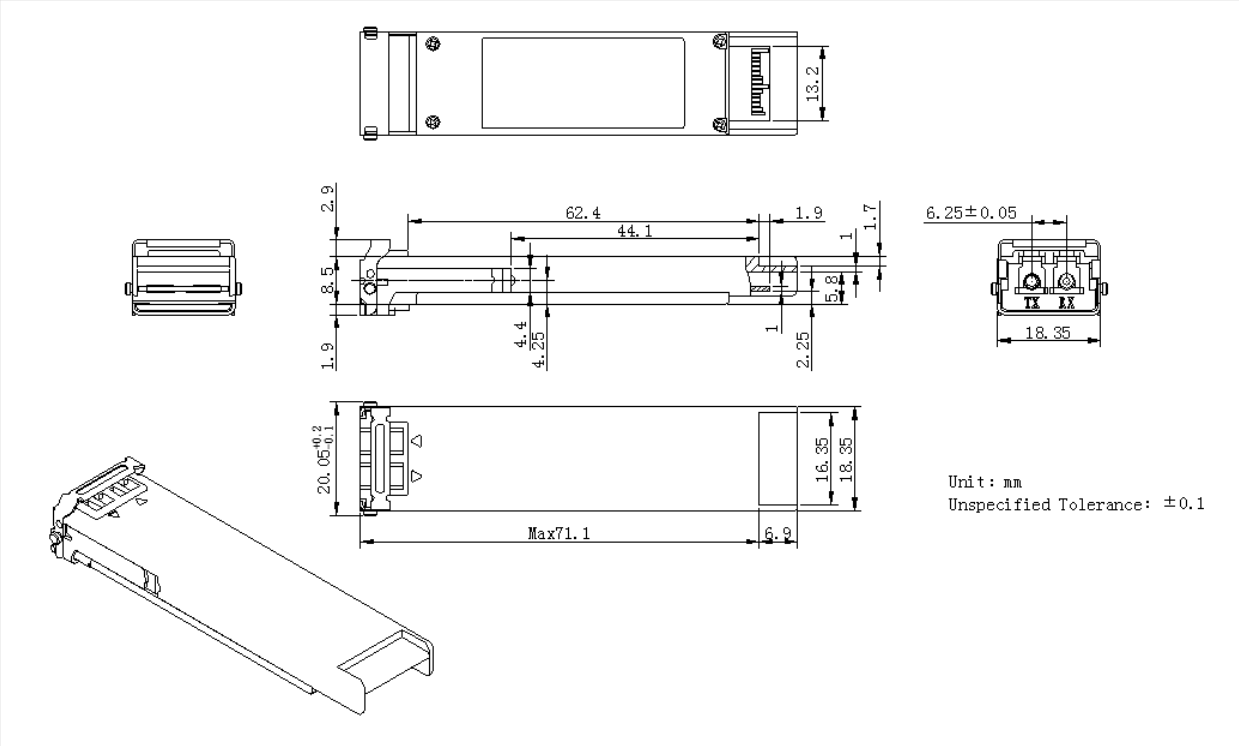
Package Outline



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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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

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RTXM226-660	196.0	1529.55
RTXM226-661	196.1	1528.77