Applications

- Gigabit Ethernet
- Fiber Channel
- Switch to Switch interface
- Switched backplane applications
- Router/Server interface
- Other Optical Links

Product Features

- Dual data-rate of 1.25Gbps/1.063Gbps operation
- TX1310nm/ TX1550nm FP laser
- RX1550/RX1310 PIN photo detector for 3km transmission
- BIDI SC/UPC type pluggable optical interface
- Compliant with SFP MSA and SFF-8472 with simplex SC receptacle
- RoHS compliant and lead-free
- Single +3.3V power supply
- Support Digital Diagnostic Monitoring interface
- Case operating temperature Commercial: 0°C to +70°C
  Extended: -10°C to +80°C
  Industrial: - 40°C to +85°C

General

SFP-WDM-SM-0203* - the receiver section uses an integrated InGaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.

Transceivers are high performance, cost effective modules supporting dual data-rate of 1.25Gbps/1.0625Gbps and 3km transmission distance with SMF.

The transceiver consists of three sections: a FP laser transmitter, a PIN photodiode integrated with a trans-impedance preamplifier (TIA) and MCU control unit. All modules satisfy class I laser safety requirements.

The transceivers are compatible with SFP Multi-Source Agreement (MSA) and SFF-8472. For further information, please refer to SFP MSA.

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RoHS Compliant

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Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Supply Voltage	Vcc	-0.5	4.0	V	
Storage Temperature	Ts	-40	85	°C	
Relative Humidity	RH	0	85	%	

Note: Stress in excess of the maximum absolute ratings can cause permanent damage to the module

General Operating Characteristics

Parameter		Symbol	Min.	Typ	Max.	Unit	Note
Data Rate	Ethernet			1.25		Gb/s	
	Fiber Channel			1.25			
Supply Voltage		Vcc	3.13	3.3	3.47	V	
		Vcc				V	
Supply Current		Icc_5				mA	
		Icc_3			400	mA	
Operating Case Temp.		Tc	0		70	°C	

Electrical Input/Output Characteristics

Parameter		Symbol	Min.	Typ	Max.	Unit	Note
Transmitter							
Diff. input voltage swing			120		820	mVpp	1
Tx Disable input	**H**	VIH	2.0		Vcc+0.3	V	
	L	VIL	0		0.8		
Tx Fault output	**H**	VOH	2.0		Vcc+0.3	V	2
	L	VOL	0		0.8		
Input Diff. Impedance		Zin		100		Ω	
Receiver							
Diff. output voltage swing			340	650	800	mVpp	3
Rx LOS Output	**H**	VOH	2.0		Vcc+0.3	V	2
	L	VOL	0		0.8		

Notes:
1. TD+/- are internally AC coupled with 100Ω differential termination inside the module.
2. Tx Fault and Rx LOS are open collector outputs, which should be pulled up with 4.7k to 10kΩ resistors on the host board. Pull up voltage between 2.0V and Vcc+0.3V.
3. RD+/- outputs are internally AC coupled, and should be terminated with 100Ω (differential) at the user SERDES.

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Optical Characteristics

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Transmitter						
Operating Wavelength		1270 (1500)	1310 (1550)	1350 (1570)	nm	
Ave. output power (Enabled)	Po	-14		-7	dBm	1
Extinction Ratio	ER	9			dB	1
RMS spectral width	Δλ			4	nm	
Rise/Fall time (20%~80%)	Tr/Tf			0.26	ps	2
Output Optical Eye	Compliant with IEEE802.3 z (class 1 laser safety)					
Receiver						
Operating Wavelength		1530 (1270)	1550 (1310)	1570 (1370)	nm	
Sensitivity	Psen			-22	dBm	3
Min. overload	Pimax	-3			dBm	
LOS Assert	Pa	-35			dBm	
LOS De-assert	Pd			-21	dBm	4
LOS Hysteresis	Pd-Pa	0.5		6	dB	

Notes:
1. Measure at 2^23-1 NRZ PRBS pattern
2. Transmitter eye mask definition
3. Measured with Light source 1550nm(1310nm), ER=9dB; BER =<10^-12 @PRBS=2^23-1 NRZ.
4. When LOS de-asserted, the RX data+/- output is signal output.

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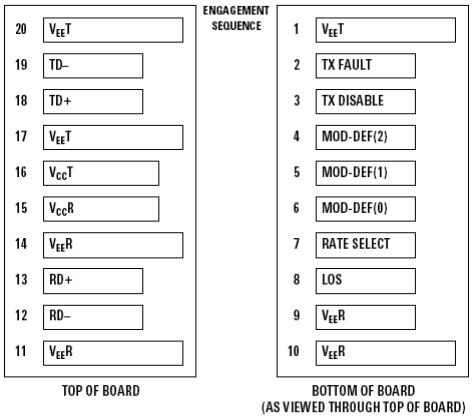
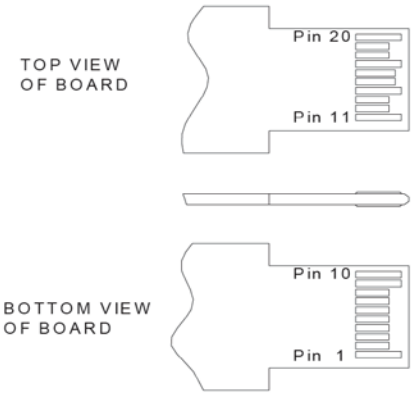
Pin Definitions and Functions





Pin	Symbol	Name/Description
1	VEET [1]	Transmitter Ground
2	Tx_FAULT [2]	Transmitter Fault
3	Tx_DIS [3]	Transmitter Disable. Laser output disabled on high or open
4	SDA [2]	2-wire Serial Interface Data Line
5	SCL [2]	2-wire Serial Interface Clock Line
6	MOD_ABS [4]	Module Absent. Grounded within the module
7	RS0 [5]	Rate Select 0
8	RX_LOS [2]	Loss of Signal indication. Logic 0 indicates normal operation
9	RS1 [5]	Rate Select 1
10	VEER [1]	Receiver Ground
11	VEER [1]	Receiver Ground
12	RD-	Receiver Inverted DATA out. AC Coupled
13	RD+	Receiver DATA out. AC Coupled
14	VEER [1]	Receiver Ground
15	VCCR	Receiver Power Supply
16	VCCT	Transmitter Power Supply
17	VEET [1]	Transmitter Ground
18	TD+	Transmitter DATA in. AC Coupled
19	TD-	Transmitter Inverted DATA in. AC Coupled
20	VEET [1]	Transmitter Ground

Notes:
1. When high, this output indicates a laser fault of some kind. Low indicates normal operation. And should be pulled up with a 4.7 – 10KΩ resistor on the host board.
2. TX disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7 – 10KΩ resistor. Its states are:
Low (0 – 0.8V): Transmitter on (>0.8, < 2.0V): Undefined
High (2.0V~Vcc+0.3V): Transmitter Disabled Open: Transmitter Disabled

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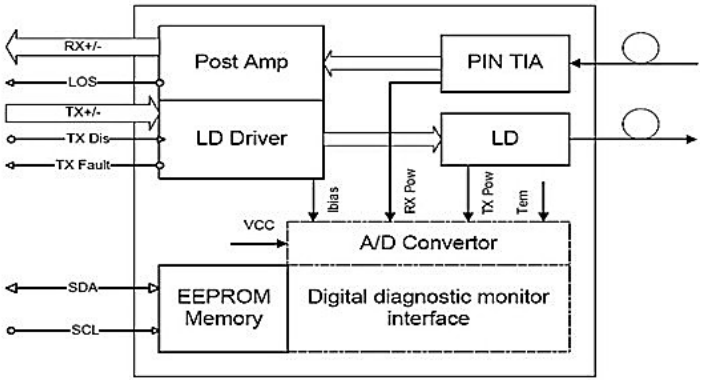
3. Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7K – 10KΩ resistor on the host board. The pull-up voltage shall be VccT or VccR.

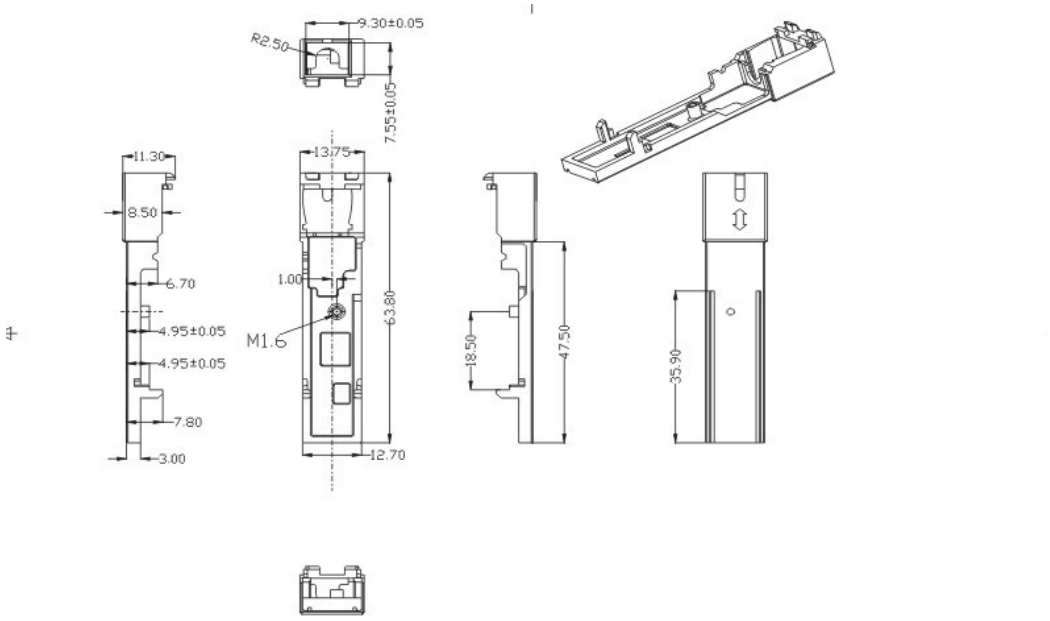
Mod-Def 0 has been grounded by the module to indicate that the module is present
Mod-Def 1 is the clock line of two wire serial interface for serial ID
Mod-Def 2 is the data line of two wire serial interface for serial ID

4. When high, this output indicates loss of signal (LOS). Low indicates normal operation.
5. RD+/-: These are the differential receiver outputs. They are AC coupled 100Ω differential lines which should be terminated with 100Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board.
6. TD+/-: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board.

Functional Diagram



Package Dimensions



SFP-WDM-SM-0203*

Diagnostics

Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70 -40 to +85	°C	±3°C	Internal/ External
Voltage	3.0 to 3.6	V	±3%	Internal/ External
Bias Current	2 to 80	mA	±10%	Internal/ External
TX Power	-16 to -4	dBm	±3dB	Internal/ External
RX Power	-23 to 0	dBm	±3dB	Internal/ External

Ordering Information

Part Number	Output Power	Rec. Sens	Data Rate	Wavelength	Distance
SFP-WDM-SM-0203A	*-14 ~ -7 db*	*-20 db*	*1.25G*	*TX1310/RX1550nm*	*3km*
SFP-WDM-SM-0203B	*-14 ~ -7 db*	*-20 db*	*1.25G*	*TX1550/RX1310nm*	*3km*

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