

PRODUCT SPECIFICATION

CONNECT

IT

EUROLAN SFP SFP 1G BIDI 20KM



Ordering information

Part number	E-number	Description
201-SFP-20-1G-TX1310-RX1550	5173442	SFP 1G WDM TX1310/RX1550 20KM

Eurolan Fiber Modules deliver reliable fiber-optic connectivity for professional installations where both standards compliance and operational reliability are essential. With broad compatibility and a robust technical design, these SFP modules are engineered for long-term use in demanding network environments. Compatible with Zyxel, TP-Link, and many other brands.

Feature:

- Supports 1250Mb/s bit rates
- Simplex LC connector
- Hot pluggable
- 1310nm FP transmitter, 1550nm PIN photo-detector
- Applicable for 20km SMF connection
- Digital Diagnostic Monitor Interface
- Low EMI and excellent ESD protection
- Compliant with SFP MSA and SFF-8472
- +3.3V single power supply
- Operating case temperature:
- Commercial: 0 to 70 °C
- Industrial: -40 to 85 °C

Application:

- Gigabit Ethernet
- Fiber Channel
- Other Optical Links

Key Features:

- Up to 1.25 Gbps with BiDi transmission (TX1310 / RX1550 nm)
- Transmission distance up to 20 km over singlemode fiber
- Fully compliant with the MSA Standard
- CE and RoHS approved
- Operating temperature range: 0°C to +70°C

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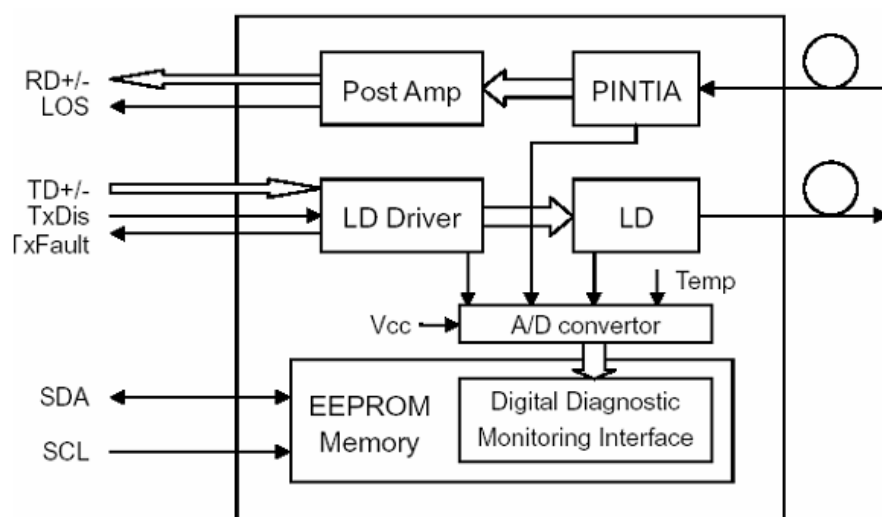
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Product descriptions

The SFP-BIDI transceivers are high performance, cost effective modules supporting dual data-rate of 1.25Gbps/1.0625Gbps and 20km transmission distance with SMF. The transceiver consists of three sections: a FP or a DFB 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.

Functional diagram



Absolute maximum ratings

Parameter	Symbol	Min	Max	Units
Storage temperature	Ts	-40	+85	°C
Supply voltage	Vcc	0.5	4.0	V
Relative humidity	RH	0	85	%

Note:

Stress in excess of the maximum absolute ratings can cause permanent damage to the transceiver.

General operating characteristics

Parameter	Symbol	Min	Typical	Max	Units
Supply voltage	Vcc	3.13	3.3	3.47	V
Operating case temperature	Tc	0		70	°C
	Tl	-40		85	
Supply current	Icc ₅			220	mA
Data rate	DR		1250		Mb/s

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Electrical characteristics (TOP(C) = 0 to 70 °C , TOP(I) = -40 to 85 °C , VCC = 3.13 to 3.47 V)

Parameter		Symbol	Min	Typical	Max	Units	Note
Transmitter							
Input differential impedance		Zin		100		Ohm	
Differential data input swing		Vin,pp	120		820	mVpp	1
Tx Disable Input Voltage-High		VIH	2		3.45	V	
Tx Disable Input Voltage-Low		VIL	0		0.8		
Tx Fault Output Voltage-High		VOH	Vcc-0.5		Vcc+0.3	V	2
Tx Fault Output Voltage-Low		VOL	0		0.5		
Receiver							
Output differential impedance		Zout	90		110	Ohm	
Differential data output swing		Vout,pp	340		800	mVpp	3
LOS	Asserted	VLOS_F	Vcc-0.5		Vcc+0.3	V	2
	De asserted	VLOS_N	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..

Optical characteristics (TOP(C) = 0 to 70 °C , TOP(I) = -40 to 85 °C , VCC = 3.13 to 3.47 V)

Parameter	Symbol	Min	Typical	Max	Units	Note
Transmitter						
Operating Wavelength	λ	1270	1310	1360	Nm	
Ave. output power (Enabled)	PAVE	-9		-3	dBm	1
Extinction Ratio	ER	9			dB	1
RMS spectral width	Δλ			3	nm	DFB=1
Rise/Fall time (20%~80%)	Tr/Tf			0.26	Ps	2
Output Optical Eye	Compliant with IEEE802.3 z (class 1 laser safety)					

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Optical characteristics (TOP(C) = 0 to 70 °C , TOP(I) = -40 to 85 °C , VCC = 3.13 to 3.47 V) Continued

Parameter	Symbol	Min	Typical	Max	Units	Note
Receiver						
Operating Wavelength	λ	1530	1550	1570	Nm	
Receiver Sensitivity	PSEN1			-22	dBm	3
Min. Overload	PMAX			-3	dBm	3
LOS Assert	Pa	-35			dBm	
LOS De-assert	Pd			-25	dBm	
LOS Hysteresis	Pd-Pa	0.5		5	dB	

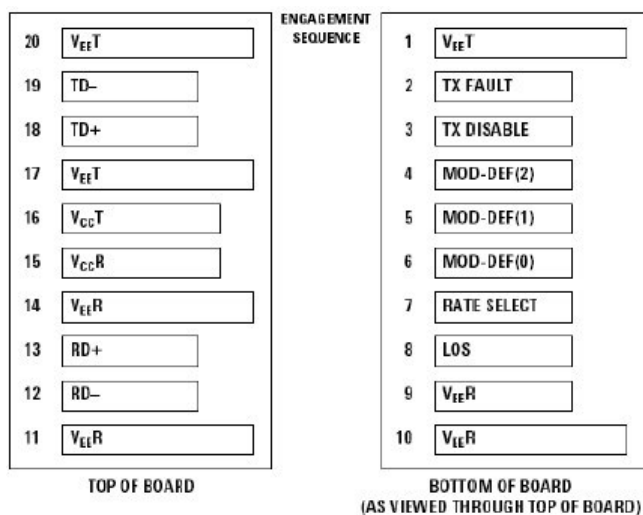
Notes:

Note 1) Measured at 1250 Mb/s with PRBS 223 – 1 NRZ test pattern.

Note 2) Unfiltered, measured with a PRBS 223-1 test pattern @1250Mbps

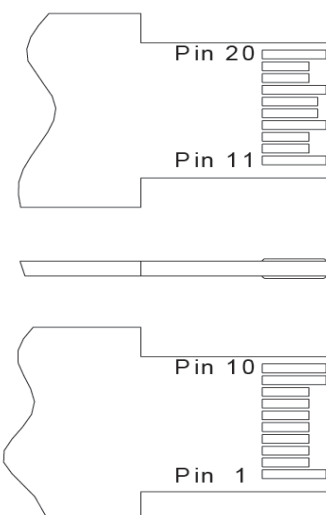
Note 3) Measured at 1250 Mb/s with PRBS 223 – 1 NRZ test pattern for BER < 1x10-10

Pin definition and functions



TOP VIEW
OF BOARD

BOTTOM VIEW
OF BOARD



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Pin description			
Pin	Symbol	Description	Note
1	VeeT	Tx ground	
2	Tx fault	Tx fault indication, Open Collector Output, active "H"	1
3	Tx disable	LVTTL Input, internal pull-up, Tx disabled on "H"	2
4	MOD DEF2	2 wire serial interface data input/output (SDA)	3
5	MOD DEF1	2 wire serial interface clock input (SCL)	3
6	MOD DEF0	Model present indication	3
7	Rate select	Not connected	
8	LOS	Rx loss of signal, Open Collector Output, active "H"	4
9	VeeR	Rx ground	
10	VeeR	Rx ground	
11	VeeR	Rx ground	
12	RD-	Inv. Received data output	5
13	RD+	Received data output	5
14	VeeR	Rx ground	
15	VccR	Rx power supply	
16	VccT	Tx power supply	
17	VeeT	Tx ground	
18	TD+	Transmit data in	6
19	TD-	Inverse transmit data in	6
20	VeeT	Tx ground	

Notes:

- When high, this output indicates a laser fault of some kind. Low indicates normal operation. And should be pulled up with a 4.7 – 10K Ω resistor on the host board.
- 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 – 10K Ω 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
- Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7K – 10K Ω resistor on the host board. The pull-up voltage shall be between 2.0V–Vcc+0.3V.
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
- When high, this output indicates loss of signal (LOS). Low indicates normal operation.
- RD+/-: These are the differential receiver outputs. They are AC coupled 100 Ω differential lines which should be terminated with 100 Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board.
- TD+/-: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100 Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board.

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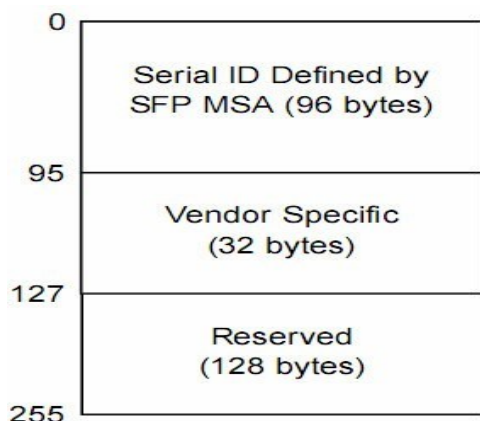
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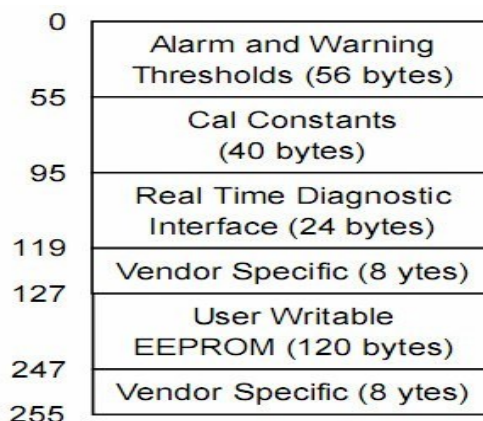
EEPROM Section

The optical transceiver contains an EEPROM. It provides access to sophisticated identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information. The serial interface uses the 2-wire serial CMOS EEPROM protocol defined for the ATMEL AT24C01A/02/04 family of components. When the serial protocol is activated, the host generates the serial clock signal (SCL, Mod Def 1). The positive edge clocks data into those segments of the EEPROM that are not write protected within the SFP transceiver. The negative edge clocks data from the SFP transceiver. The serial data signal (SDA, Mod Def 2) is 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 Transceiver provides diagnostic information about the present operating conditions. The transceiver generates this diagnostic data by digitization of internal analog signals. Calibration and alarm/warning threshold data is written during device manufacture. Received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring all are implemented. The diagnostic data are raw A/D values and must be converted to real world units using calibration constants stored in EEPROM locations 56 – 95 at wire serial bus address A2h. The digital, Diagnostic memory map specific data field define as following:



2 wire address LOL0000x (A0h)



2 wire address LOL000Lx (A2h)

Digital diagnostic specifications The transceivers can be used in host systems that require either internally or externally calibrated digital diagnostics.

Parameter	Symbol	Units	Min	Max	Accuracy	Note
Transceiver temperature	DTemp-E	°C	-45	+90	±5°C	2
Transceiver supply voltage	DVoltage	V	3.0	3.6	±3%	
Transmitter bias current	DBias	mA	2	80	±10%	3
Transmitter output power	DTx-Power	dBm	-11	-1	±3dB	
Receiver average input power	DRx-Power	dBm	-25	0	±3dB	

Notes:

- 1.Support Internal/ External Calibration
- 2.When Operating temp.=0~70 °C,the range will be min=-5,Max=+75.
3. The accuracy of the Tx bias current is 10% of the actual current from the laser driver to the laser

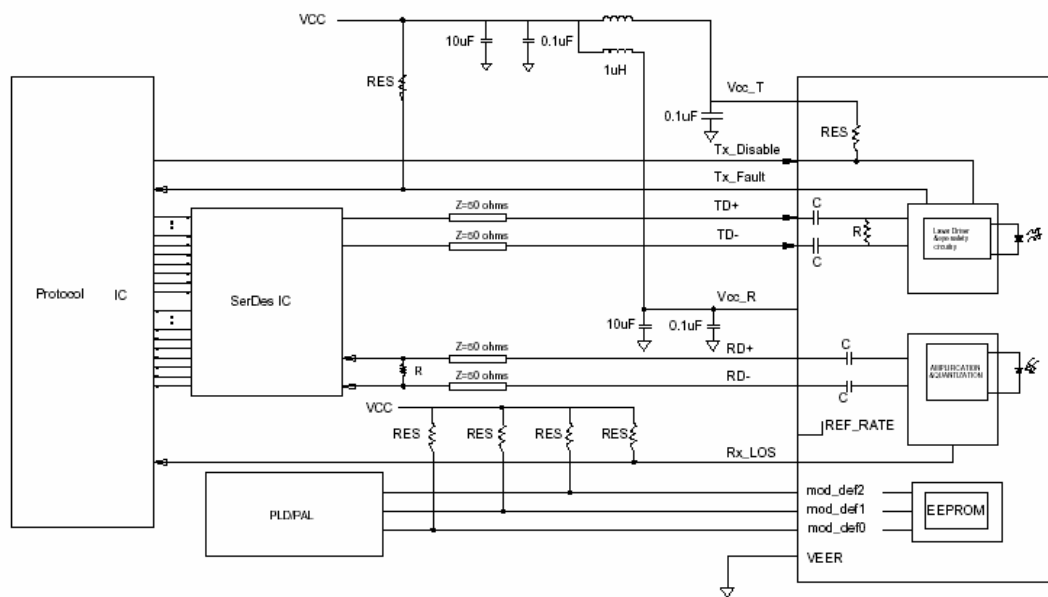
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Typical Interface circuit



Recommended board layout hole pattern

