PRODUCT SPECIFICATION

CONNECT IT

EUROLAN SFP
SFP+ SM 20KM



Ordering information		
Part number	E-number	Description
201-SFP-20-TX1330-RX1270	5173448	SFP+ SM TX1330/RX1270 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 9.95 to 10.3Gb/s bit rates
- Simplex LC Connector
- Hot pluggable SFP+ footprint
- Uncooled 1270nm DFB transmitter, 1330nm PIN photo-detector
- Uncooled 1330nm DFB transmitter, 1270nm PIN photo-detector
- Applicable for 10km SMF connection
- Low power consumption, < 1W
- Digital Diagnostic Monitor Interface
- Optical interface compliant to IEEE 802.3ae 10GBASE-LR
- Electrical interface compliant to SFF-8431
- Operating case temperature:
- Commerical:-20 to 75 °C
- Industrial:-40 to 85 °C

Application:

- 10GBASE-LR at 10.3125Gbps
- 10GBASE-LW at 9.953Gbps
- Other optical link

Key Features:

- Up to 10 Gbps with BiDi transmission (TX1330 nm / RX1270 nm)
- Transmission distance up to 10 km over singlemode fiber
- SFP+ with LC simplex connector for easy integration
- Pair with a complementary SFP+ module with reversed TX/RX wavelengths

This module complements its matching BiDi partner, providing a stable and cost-effective fiber link that maximizes the use of existing infrastructure without the need for additional cabling.

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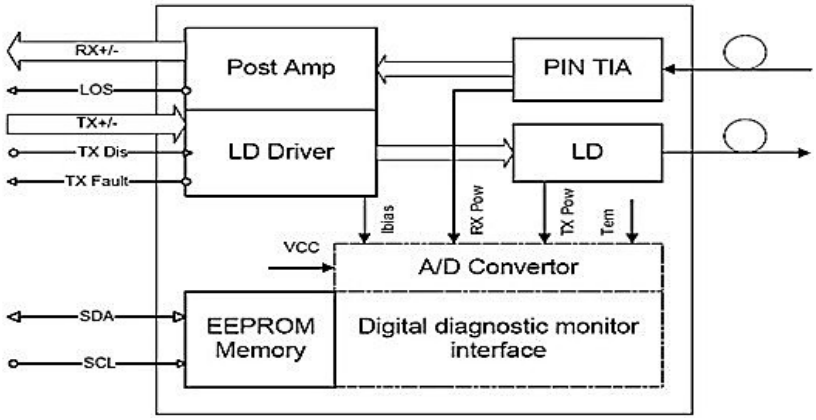
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Product descriptions

The SFP+-BIDI series single mode transceiver is small form factor pluggable module for optical data communications such as 10GBASE-LR/LW defined by IEEE 802.3ae. It is with the SFP+ 20-pin connector to allow hot plug capability. The SFP+-BIDI module is designed for single mode fiber and operates at a nominal wavelength of 1310nm or 1550nm; The transmitter section uses a multiple quantum well DFB, which is class 1 laser compliant according to International Safety Standard IEC-60825.The receiver section uses an integrated InGaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC. The transceiver designs are optimized for high perform -ance and cost effective to supply customers the best solutions for telecommunication.

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 tranceiver.

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
	TI	-40		80	
Supply current	Icc_5			285	mA
Data rate	DR	9.95		10.3125	Gb/s

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Electrical characteristics (TOP(C) = -20 to 75 °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	180		700	mVpp	1
Transmit Disable Voltage		VD	Vcc-0.8		Vcc	V	
Transmit Enable Voltage		VEN	Vee		Vee+0.8		
Receiver							
Differential data output swing		Vout.pp	300		850	mVpp	2
Output rise time and fall time		Tr, Tf	28	2.0	Vcc+0.3	Ps	3
LOS	Asserted	VLOS_F	Vcc-0.8		Vcc	V	4
	De asserted	VLOS_N	Vee		Vee+0.8		

Notes:

1. Connected directly to TX data input pins. AC coupling from pins into laser driver IC.
2. Into 100Ω differential termination.
3. 20 – 80%. Measured with Module Compliance Test Board and OMA test pattern. Use of four 1's and four 0's sequence in the PRBS 9 is an acceptable alternative.
4. LOS is an open collector output. Should be pulled up with 4.7kΩ – 10kΩ on the host board. Normal operation is logic 0; loss of signal is logic 1.

Optical characteristics (TOP(C) = -20 to 75 °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	1260	1270	1285	nm	
		1290	1330	1350		
Ave. output power (Enabled)	PAVE	-3		+3	dBm	1
Side-Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio	ER	4	4.5		dB	
RMS spectral width	Δλ			1	nm	
Rise/Fall time (20%~80%)	Tr/Tf			50	Ps	
Dispersion penalty	TDP			3.2	dB	
Relative Intensity Noise	RIN			-128	dB/Hz	
Output Optical Eye	Compliant with IEEE802.3ae					

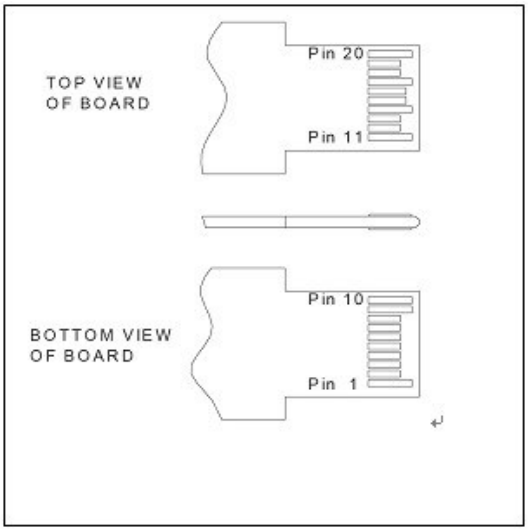
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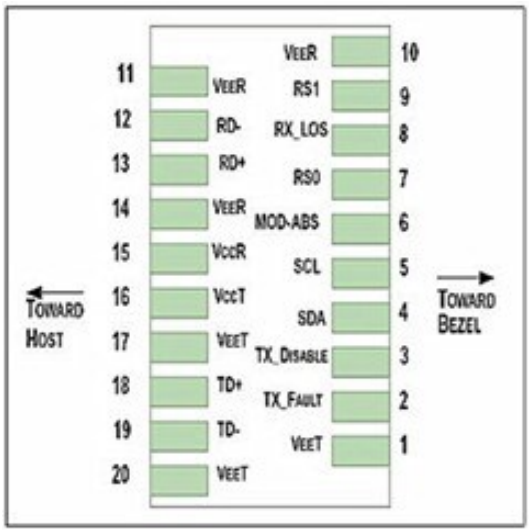
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Optical characteristics (TOP(C) = 0 to 70 °C , TOP(I) =-40 to 85 °C ,VCC = 3.13 to 3.47 V) Continued						
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Units**	**Note**
Receiver						
Operating Wavelength	λ	1290	1330	1350	nm	
		1260	1310	1355		
Receiver Sensitivity (ER=4.5)	PSEN1			-14.4	dBm	2
Receiver Sensitivity (ER=6)	PSEN2			-14.4	dBm	2
Average Receive Power	PAVE			±0.5	dBm	
Receiver Reflectance	Rrx			-12	dB	
LOS assert	Pa	-30			dBm	
LOS de-assert	Pd			-17	dBm	
LOS Hysteresis	Pd-Pa	0.5		4	dB	

Notes:
1. Average power figures are informative only, per IEEE 802.3ae.
2. Measured with worst ER; BER<10^{-12}; 2^{31-1} PRBS.

Pin definition and functions





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Pin description			
Pin	**Symbol**	**Description**	**Note**
1	VeeT	Transmitter Ground	1
2	Tx fault	Transmitter Fault	2
3	Tx disable	Transmitter Disable. Laser output disabled on high or open	3
4	SDA	2-wire Serial Interface Data Line	2
5	SCL	2-wire Serial Interface Clock Line	2
6	MOD_ABS	Module Absent. Grounded within the module	4
7	RS0	Rate Select 0	
8	RX_LOS	Loss of Signal indication. Logic 0 indicates normal operation	2
9	RS1	Rate select 1	5
10	VeeR	Receiver Ground	1
11	VeeR	Receiver Ground	1
12	RD-	Receiver Inverted DATA out. AC Coupled	
13	RD+	Receiver DATA out. AC Coupled	
14	VeeR	Receiver Ground	1
15	VccR	Receiver power supply	
16	VccT	Transmitter power supply	
17	VeeT	Transmitter ground	1
18	TD+	Transmitter DATA in. AC Coupled	
19	TD-	Transmitter Inverted DATA in. AC Coupled	
20	VeeT	Transmitter ground	1

Notes:

1.Module circuit ground is isolated from module chassis ground within the module.

2.should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15Vand 3.6V.

3.Tx_Disable is an input contact with a 4.7 kΩ to 10 kΩ pullup to VccT inside the module.

4.Mod_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull this contact up to Vcc_Host with a resistor in the range 4.7 kΩ to10 kΩ.Mod_ABS is asserted “High” when the SFP+ module is physically absent from a host slot.

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Serial interface for ID and DDM

The SFP+-BIDI transceiver support the 2-wire serial communication protocol as defined in the SFP+ MSA. The standard SFP+ serial ID provides access to identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information. Additionally, This SFP+ transceivers provide an enhanced digital diagnostic monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage. It also defines a sophisticated system of alarm and warning flags, which alerts end-users when particular operating parameters are outside of a factory set normal range.

The SFP MSA defines a 256-byte memory map in EEPROM that is accessible over a 2-wire serial interface at the 8 bit address 1010000X(A0h), so the originally monitoring interface makes use of the 8 bit address(A2h), so the originally defined serial ID memory map remains unchanged. The structure of the memory map is shown in Table1.

2 wire address 1010000X (**A0h**)	
Address	**Information**
0~95	Serial ID Defined by SFP MSA (96 bytes)
96~127	Vendor Specific (32 bytes)
128~255	Reserved,SFF8079 (128 bytes)

2 wire address 1010001X (**A2h**)	
Address	**Information**
0~55	Alarm and Warning Thresholds (56 bytes)
56~95	Calibration Constants (40 bytes)
96~119	Real Time Diagnostic Interface (24 bytes)
120~127	Vender Specific (8 bytes)
128~247	User Writable EEPROM (120 bytes)
248~255	Vender Specific (8 bytes)

Table 1. Digital Diagnostic Memory Map (Specific Data Field Descriptions)

Digital diagnostic specifications

The SFP+-BIDI 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	1,2
Transceiver supply voltage	DVoltage	V	2.8	4.0	±3%	
Transmitter bias current	DBias	mA	0	127	±10%	3
Transmitter output power	DTx-Power	dBm	-8	+1	±2dB	
Receiver average input power	DRx-Power	dBm	-17	+1	±2dB	

Notes:

1.When Operating temp.=0~70 °C,the range will be min=-5,Max=+75

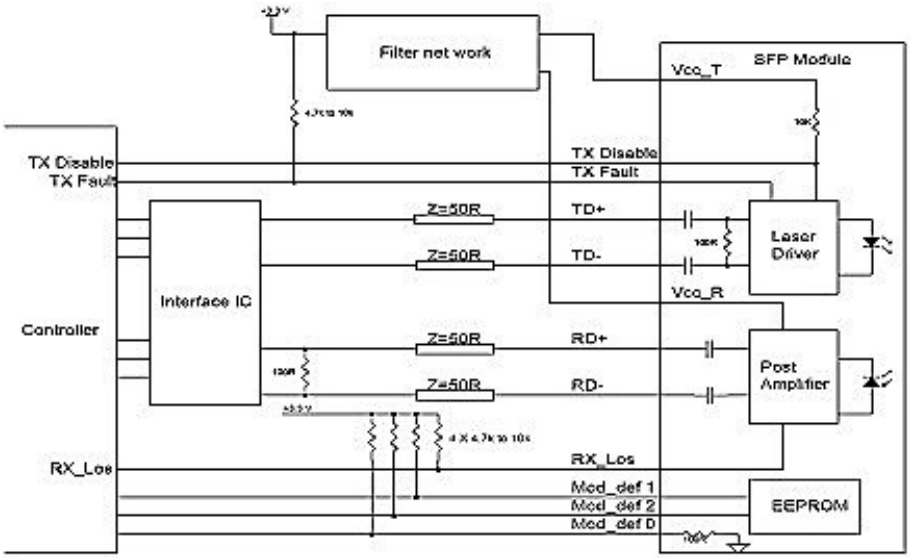
2. Internally measured

3. The accuracy of the Tx bias current is 10% of the actual current from the laser driver to the laser

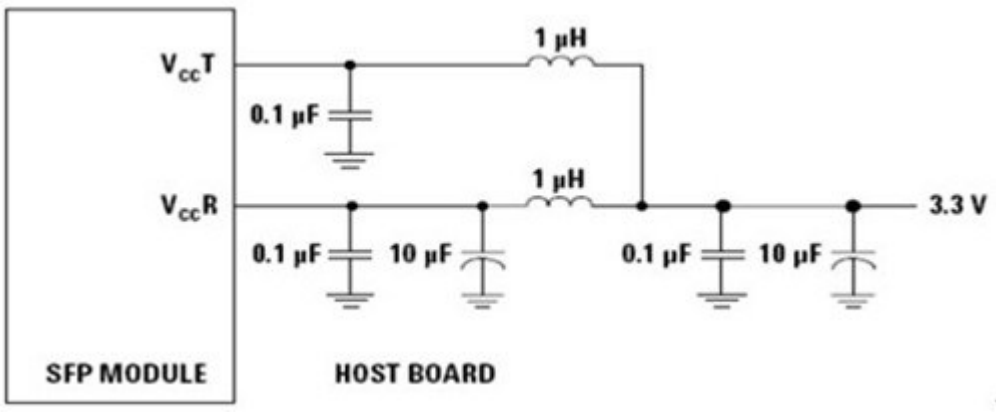
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Typical Interface circuit



Recommended power supply filter



Note:
Inductors with DC resistance of less than 1Ω should be used in order to maintain the required voltage at the SFP input pin with 3.3V supply voltage. When the recommended supply filtering network is used, hot plugging of the SFP transceiver module will result in an inrush current of no more than 30 mA greater than the steady state value

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Package dimensions

