Bi-Di SFP Transceiver (HOBSFP-ER)

40km 1310nm /1550nm

Features

- Download and upload: 1000Mbps/1000Mbps data rate with loss rate =0
- 1310nm/1550nm wavelength laser
- Hot-Pluggable
- Single fiber LC/UPC connector or SC
- Up to 40 km on 9/125μm Single mode fiber
- Monitoring Interface Compliant with SFF-8472
- Compliant to IEEE 802.3Z 1000 Base, Gigabit Ethernet & SFP MSA
- Manufactured in an ISO 9001 compliant facility
- Operating temperature range: 0°C to 70°C
- RoHS Compliant

Applications

- Ethernet Switch and Enterprise Router
- Metro Ethernet and Fibre Channel
- Other Optical Links

Compatible brand list:

- OLT, MEN switch, L2 switch of Huawei, ZTE, Nokia…or customized

Part numbers

P/N	*Data Rate*	*Wavelength*	*Connector*	*Distance*
HOBSFP-ER35	1Gbps	1310Tx/1550Rx	LC/UPC	40km
HOBSFP-ER53	1Gbps	1550Tx/1310Rx	LC/UPC	40km

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit
Storage Temperature	T_S	-40		+85	°C
Case Temperature	T_C	0		70	°C

Supply Voltage	V_{CC}	-0.5		4	V
Relative Humidity	RH	0		90	%

Recommended Operating Environment:

Parameter	Symbol	Min.	Typical	Max.	Unit
Case operating Temperature	T_C	0		70	°C
Supply Voltage	V_{CC}	3,135		3,5	V
Supply Current	Icc		200	300	mA

Electrical Characteristics (T_{OP} = 0 to 75°C, VCC = 3,135 to 3,5 Volts)

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Transmitter Section:						
Input differential impedance	R_{in}	90	100	110	Ω	1
Single ended data input swing	$V_{in\ PP}$	250		1200	mVp-p	
Transmit Disable Voltage	V_D	Vcc – 1.3		Vcc	V	2
Transmit Enable Voltage	V_{EN}	Vee		Vee+ 0.8	V	
Transmit Disable Assert Time	$T_{dessert}$			10	us	
Receiver Section:						
Single ended data output swing	Vout,pp	250		800	mv	3
Data output rise time	Tr		100	175	ps	3
Data output fall time	Tf		100	175	ps	4
LOS Fault	$V_{losfault}$	Vcc – 0.5		V_{CC_host}	V	5
LOS Normal	$V_{los\ norm}$	V_{ee}		V_{ee}+0.5	V	5
Power Supply Rejection	PSR	100			mVpp	6

Note:
1. AC coupled.
2. Or open circuit.
3. Into 100 ohm differential termination.
4. 20 – 80 %
5. LOS is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
6. All transceiver specifications are compliant with a power supply sinusoidal modulation of 20 Hz to 1.5MHz up to specified value applied through the power supply filtering network.

Optical Parameters(T_{OP} = 0 to 70°C, VCC = 3,135 to 3,5 Volts)

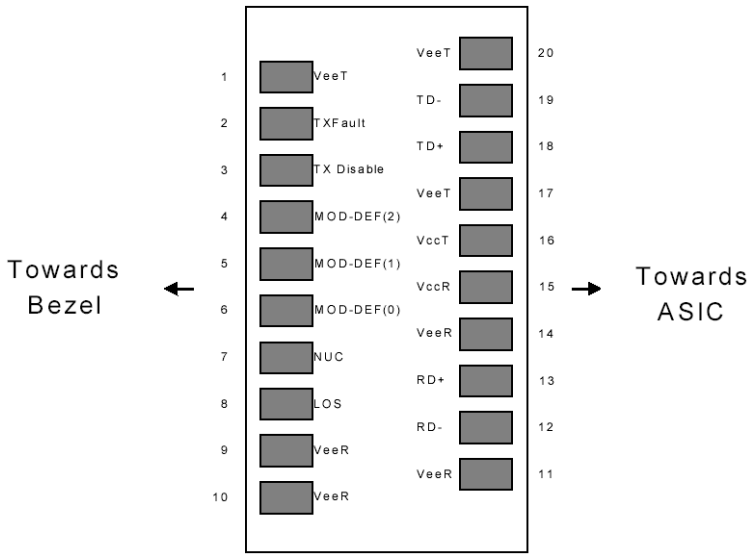
Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Transmitter Section:						
Center Wavelength	λ_c 1310	1290	1310	1330	nm	

	λ_c 1550	1530	1550	1570	nm	
Spectral Width	σ			1	nm	
Sidemode Supression ratio	SSRmin	30			dB	
Optical Output Power	P_{out}	-5		+3	dBm	1
Extinction Ratio	ER	9			dB	
Optical Rise/Fall Time	t_r / t_f			260	ps	
Relative Intensity Noise	RIN			-120	dB/Hz	
Total Jitter Contribution	TX Δ TJ			0.284	UI	
Receiver Section:						
Optical Input Wavelength	λ_c 1550	1530	1550	1570	nm	
	λ_c 1310	1290	1310	1330		
Receiver Overload	P_{ol}	-3			dBm	
RX Sensitivity	Sen			-24	dBm	2
RX_LOS Assert	LOS_A	-36			dBm	
RX_LOS De-assert	LOS_D			-25	dBm	
RX_LOS Hysteresis	LOS_H	0.5			dB	
General Specifications:						
Data Rate	BR		1		Gbps	
Bit Error Rate	BER			10^{-12}		
Max. Supported Link Length on 9/125μm SMF	L_{MAX}		40		km	
Total System Budget	LB	19			dB	

Note

1. The optical power is launched into SMF. Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulations.
2. Measured with PRBS 2^{7-1} at 10^{-12} BER

Pin Assignment



Pin Function Definitions

Pin No	Name	Function	Plug Seq	Notes
1	VeeT	Transmitter Ground	1	1
2	TX Fault	Transmitter Fault Indication	3	
3	TX Disable	Transmitter Disable	3	2
4	MOD-DEF2	Module Definition	2	3
5	MOD-DEF1	Module Definition 1	3	3
6	MOD-DEF0	Module Definition 0	3	3
7	Rate Select	Not Connected	3	4
8	LOS	Loss of Signal	3	5
9	VeeR	Receiver Ground	1	1
10	VeeR	Receiver Ground	1	1
11	VeeR	Receiver Ground		1
12	RD-	Inv. Received Data Out	3	6
13	RD+	Received Data Out	3	6
14	VeeR	Receiver Ground	3	1
15	VccR	Receiver Power	2	1
16	VccT	Transmitter Power	2	
17	VeeT	Transmitter Ground	1	
18	TD+	Transmit Data In	3	6
19	TD-	Inv. Transmit In	3	6
20	VeeT	Transmitter Ground	1	

Notes:

1. Circuit ground is internally isolated from chassis ground.
2. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
3. Should be pulled up with 4.7k - 10 kohms on host board to a voltage between 2.0V and 3.6V. MOD_DEF(0) pulls line low to indicate module is plugged in.
4. Rate select is not used
5. LOS is open collector output. Should be pulled up with 4.7k – 10 kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.
6. AC Coupled

SFP Module EEPROM Information and Management

The SFP modules implement the 2-wire serial communication protocol as defined in the SFP -8472. The serial ID information of the SFP modules and Digital Diagnostic Monitor parameters can be accessed through the I^2C interface at address A0h and A2h. The memory is mapped in Table 1. Detailed ID information (A0h) is listed in Table 2. And the DDM specification at address A2h. For more details of the memory map and byte definitions, please refer to the SFF-8472, “Digital Diagnostic Monitoring Interface for Optical Transceivers”. The DDM parameters have been internally calibrated.

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

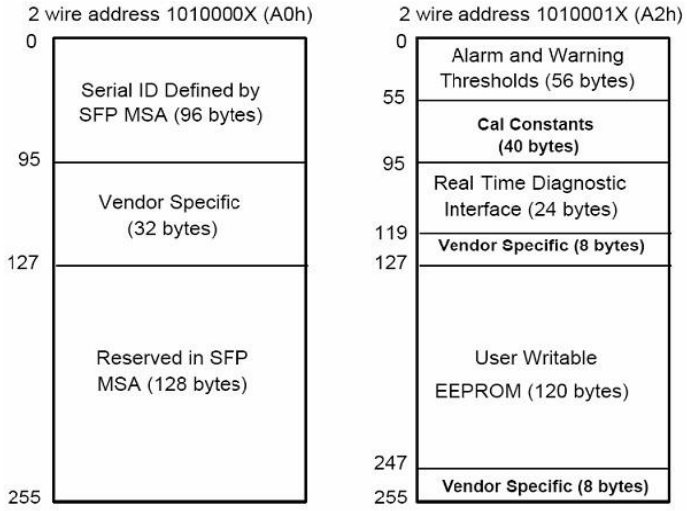


Table 2 - EEPROM Serial ID Memory Contents (**A0h**)

Data Address	Length (Byte)	Name of Length	Description and Contents
Base ID Fields			
0	1	Identifier	Type of Serial transceiver (03h=SFP)
1	1	Reserved	Extended identifier of type serial transceiver (04h)
2	1	Connector	Code of optical connector type (07=LC)
3-10	8	Transceiver	
11	1	Encoding	NRZ(03h)
12	1	BR, Nominal	Nominal baud rate, unit of 100Mbps

13-14	2	Reserved	(0000h)
15	1	Length(9um)	Link length supported for 9/125um fiber, units of 100m
16	1	Length(50um)	Link length supported for 50/125um fiber, units of 10m
17	1	Length(62.5um)	Link length supported for 62.5/125um fiber, units of 10m
18	1	Length(Copper)	Link length supported for copper, units of meters
19	1	Reserved	
20-35	16	Vendor Name	SFP vendor name
36	1	Reserved	
37-39	3	Vendor OUI	SFP transceiver vendor OUI ID
40-55	16	Vendor PN	Part Number(ASCII)
56-59	4	Vendor rev	Revision level for part number
60-62	3	Reserved	
63	1	CCID	Least significant byte of sum of data in address 0-62
Extended ID Fields			
64-65	2	Option	Indicates which optical SFP signals are implemented (001Ah = LOS, TX_FAULT, TX_DISABLE all supported)
66	1	BR, max	Upper bit rate margin, units of %
67	1	BR, min	Lower bit rate margin, units of %
68-83	16	Vendor SN	Serial number (ASCII)
84-91	8	Date code	Manufacturing date code
92-94	3	Reserved	
95	1	CCEX	Check code for the extended ID Fields (addresses 64 to 94)
Vendor Specific ID Fields			
96-127	32	Readable	specific date, read only
128-255	128	Reserved	Reserved for SFF-8079

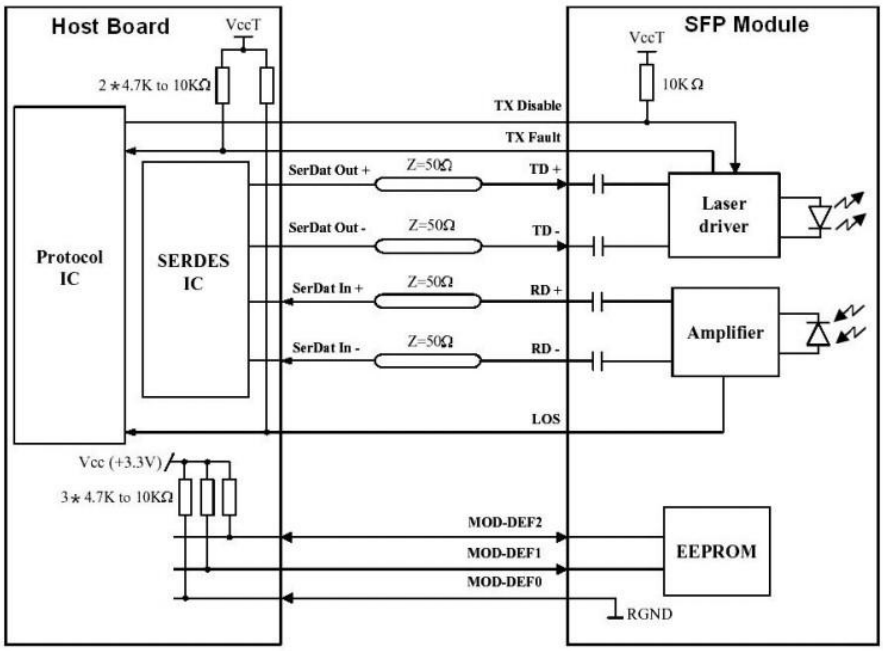
Digital Diagnostic Monitor Characteristics

Data Address	Parameter	Accuracy	Unit
96-97	Transceiver Internal Temperature	±3.0	°C
98-99	Transceiver Supply Voltage	±3.0	%
100-101	Laser Bias Current	±10	%
102-103	Tx Output Power	±3.0	dB
104-105	Rx Received Optical Power	±3.0	dB

Regulatory Compliance

Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1(>1000 V)
Electrostatic Discharge (ESD) to the Single LC Receptacle	IEC 61000-4-2 GR-1089-CORE	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2	Compatible with Class 1 laser product

Recommended Circuit



Mechanical Dimensions

