

FIBRECONNEX GIGABIT SFP MODULES

Features and Benefits

- Gigabit Ethernet
- Gigabit Fibre Channel
- SFP MSA package with Simplex LC connector
- Compliant with IEEE 802.3z,
- Digital diagnostic monitor interface compatible with SFF-8472
- Transmission with 9/125 μm SMF
- Single 3.3V Power Supply and LVTTTL Logic
- EMI FCC Part 15 Class B, EN55022 Class B and excellent ESD protection
- Operating Case Temperature: 0°C ~+85°C
- Hot-pluggable SFP Footprint
- RoHS compliant
- Class 1 laser safety EN60950, EN60825-1,2



Absolute Maximum Ratings

Table 1- Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Supply Voltage	V _{cc}	-0.5	-	+3.6	V	
Storage Temperature	T _s	-40	-	85	°C	
Operating Relative Humidity	RH	0	-	+95	%	

Recommended Operating Conditions

Table 2- Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Case Temperature	T _c	0	-	85	°C	
Power Supply Voltage	V _{cc}	3.14	3.3	3.46	V	
Power Supply Current	I _{cc}	-	-	300	mA	
Power Dissipation	P _d	-	-	1	W	
Data Rate		-	1250	-	Mbps	

Electrical Characteristics

Table 3- Electrical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Differential Data Input Swing		$V_{in\ p-p}$	200	-	2400	mV	1
Input Differential Impedance		R_{IN}	80	100	120	Ω	
Tx_Disable	Laser Disable	V_{OH}	2.0	-	VCC+0.5	V	
	Normal Operation	V_{OL}	GND	-	GND+0.8	V	
TX_Fault	Transmitter Fault	V_{OH}	2.0	-	VCC+0.5	V	
	Normal Operation	V_{OL}	GND	-	GND+0.8	V	
Differential Data Output Swing		$V_{out\ p-p}$	750	900	1050	mV	2
Rx_LOS	Los Signal	V_{OH}	2.0	-	VCC+0.5	V	
	Normal Operation	V_{OL}	GND	-	GND+0.8	V	

Note:

1. Internally AC coupled, input termination may be required for CML or LVPECL applications.
2. Internally AC coupled, CML differential output stage.

Optical Characteristics

Table 4-Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit		Notes
Transmitter							
Average Output Power	P _{OUT}	-9		-3	dBm	5km/20km	1
		-5		0		40km	
		0		5		80km	
Mean Wavelength	λ	1290	1310	1330		FXBS-3512-xxxL	
		1480	1490	1490		FXBS-4512-xxxL	
		1540	1550	1560		FXBS-5312-xxxL FXBS-5412-xxxL	
Extinction Ratio	ER	9	-	-	dB		
Spectral Width(RMS)	$\Delta\lambda$	-	-	1	nm		
P _{Out} @TX Disable Asserted	P _{OUT}	-	-	-45	dB		
Rise/Fall Time (20%~80%)	T _r /T _f			260	Ps		
Optical Eye Mask	IEEE 802.3ah Compliant						
Receiver							
Receiver Power	P _{in}			-18	dBm	5km	2
			-	-23		20km/40km/80km	
Centre Wavelength	λ_C	1290	1310	1330	nm	FXBS-5312-xxxL	
		1480	1490	1500		FXBS-5412-xxxL	
		1530	1550	1570		FXBS-3512-xxxL FXBS-4512-xxxL	
Receiver Overload	R _{sens, high}	-3	-	-	dBm		
Damage Threshold for Receive	P _{in, damage}	0					
Receiver Reflectance	RX _r	-	-	-12	dB		
LOS De-Assert	LOS _D			-	dB		
		-	-	-25		20km/40km/80km	
LOS Assert	LOS _A	-35	-	-		20km/40km/80km	
LOS Hysteresis		0.5		-			

Note:

1. Coupled into 9/125 SMF.
2. Measured with PRBS 27-1 test pattern @1.25Gbps.BER=10E-12

Recommended Interface Circuit

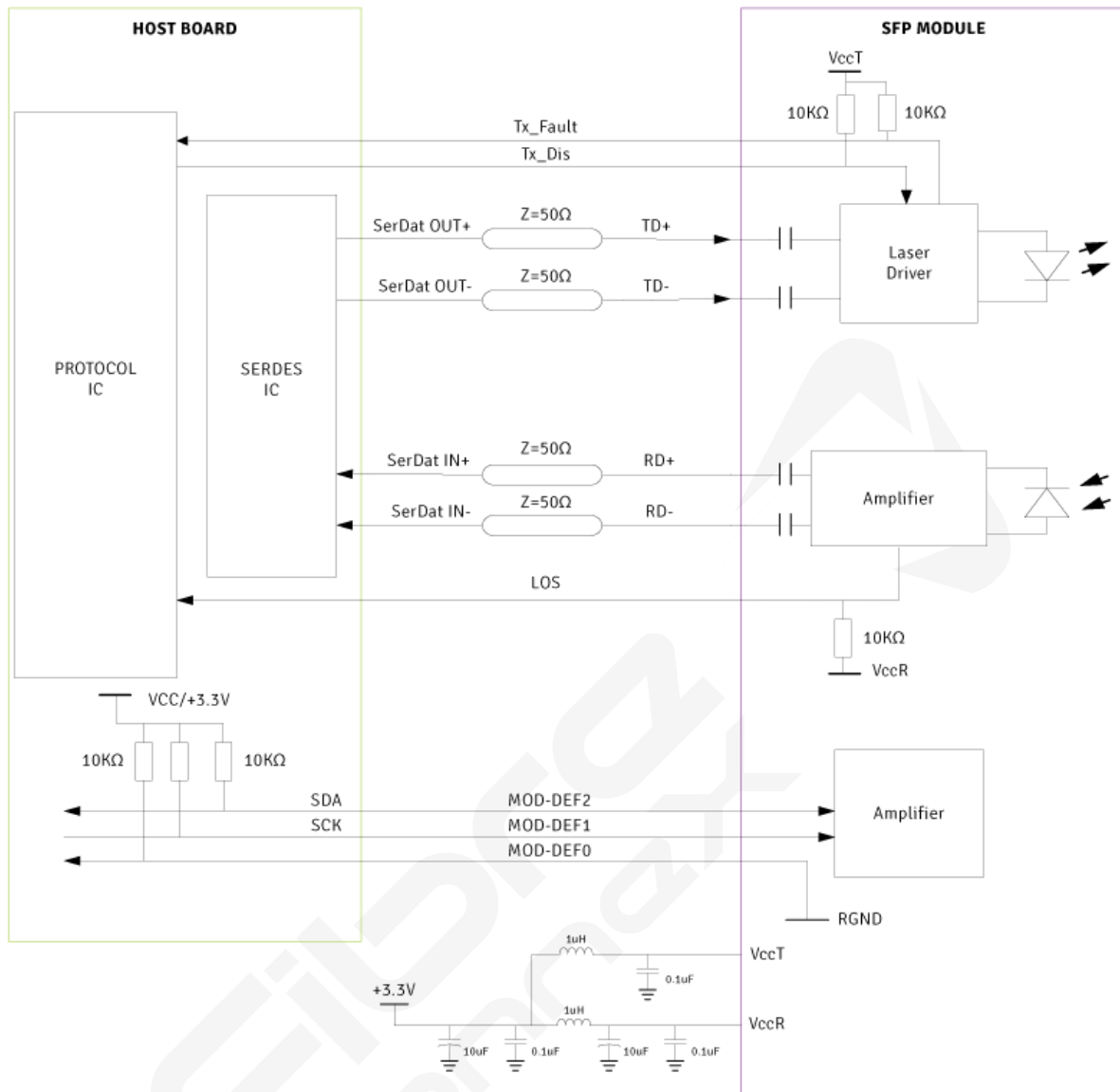


Figure 1, Recommended Interface Circuit

Pin View



Figure 2, Pin View

Table 5-Pin Function Definitions

Pin	Name	FUNCTION	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	
2	TX Fault	Transmitter Fault Indication	3	1
3	TX Disable	Transmitter Disable	3	2,
4	MOD-DEF 2	Module Definition 2	3	3
5	MOD-DEF 1	Module Definition 1	3	3
6	MOD-DEF 0	Module Definition 0	3	3
7	Rate Select	Not Connect	3	
8	LOS	Loss of Signal	3	4
9	VeeR	Receiver Ground	1	
10	VeeR	Receiver Ground	1	
11	VeeR	Receiver Ground	1	
12	RD-	Inv. Received Data Out	3	
13	RD+	Received Data Out	3	
14	VeeR	Receiver Ground	1	
15	VeeR	Receiver Ground	2	3.3V ± 5%
16	VccT	Transmitter Power	2	3.3V ± 5%

17	VccT	Transmitter Power	1	
18	TD+	Transmit Data in	3	
19	TD-	Inv. Transmit Data in	3	
20	VeeT	Transmitter Ground	1	

Note:

- TX Fault is open collector output which should be pulled up externally with a 4.7K ~10K Ω resistor on the host board to voltage between 2.0V and VCC+0.3V. Logic 0 indicates normal operation; logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.
- TX Disable input is used to shut down the laser output per the state table below. It is pulled up within the module with a 4.7~ 10K resistor.

Low (0- 0.8V):	Transmitter on
Between (0.8V and 2V):	Undefined
High (2.0 – VccT):	Transmitter Disabled
Open:	Transmitter Disabled
- MOD-DEF 0, 1, 2. These are the module definition pins. They should be pulled up with a 4.7~10K resistor on the host board to supply less than VccT+0.3V or VccR+0.3V.
 - MOD-DEF 0 is grounded by the module to indicate that the module is present.
 - MOD-DEF 1 is clock line of two wire serial interface for optional serial ID.
 - MOD-DEF 2 is data line of two wire serial interface for optional serial ID.
- LOS (Loss of signal) is an open collector output, which should be pulled up with a 4.7k~10k Ω resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; logic 1 indicates loss of signal. In the low state, the output will be pulled to less than 0.8V.

Mechanical Diagram

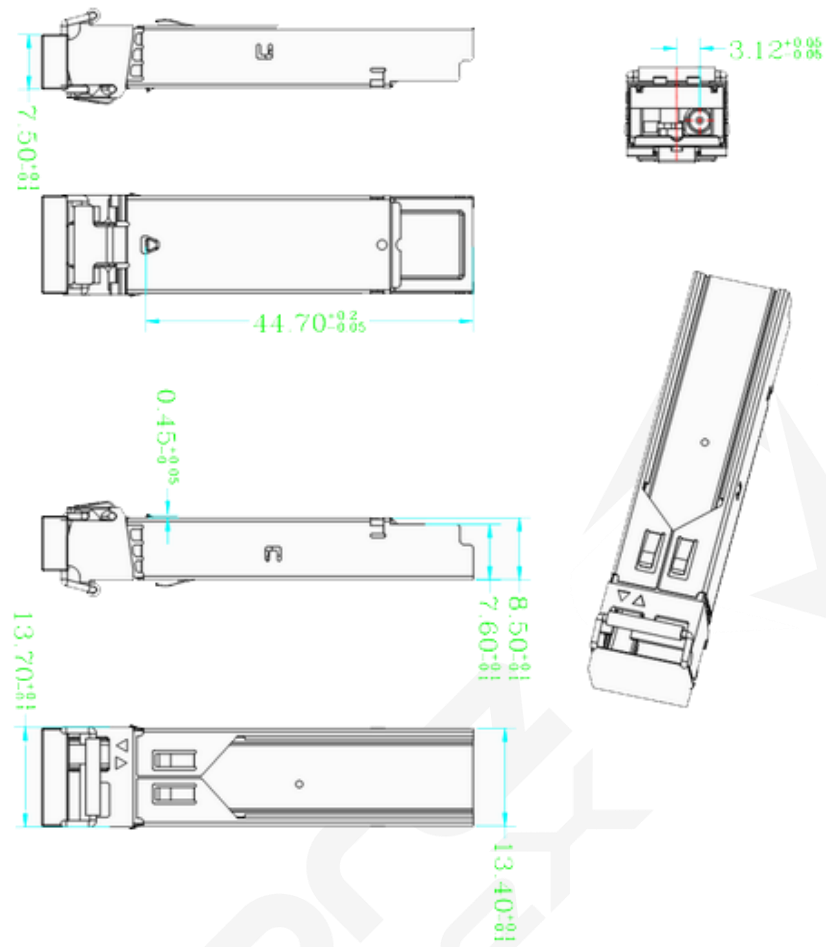


Figure 4, mechanical diagram

Ordering Information

Table 5-Pin Function Definitions

Part No.	DDM	Tx Wavelength	Rx Wavelength	Fibre Type	Optical Interface	Distance
FXSPB-3512-05D	YES	1310nm	1550nm	SMF	Single Core	5km
FXSPB-3512-05	NO					
FXSPB-5312-05D	YES	1550nm	1310nm	SMF	Single Core	5km
FXSPB-5312-05	NO					
FXSPB-3512-20D	YES	1310nm	1550nm	SMF	Single Core	20km
FXSPB-3512-20	NO					
FXSPB-5312-20D	YES	1550nm	1310nm	SMF	Single Core	20km
FXSPB-5312-20	NO					
FXSPB-3512-40D	YES	1310nm	1550nm	SMF	Single Core	40km
FXSPB-3512-40	NO					
FXSPB-5312-40D	YES	1550nm	1310nm	SMF	Single Core	40km
FXSPB-5312-40	NO					
FXSPB-4512-80D	YES	1490nm	1550nm	SMF	Single Core	80km
FXSPB-4512-80	NO					
FXSPB-5412-80D	YES	1550nm	1490nm	SMF	Single Core	80km
FXSPB-5412-80	NO					

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