

155Mbps 850nm Spring-Latch SFP Transceiver

(For 1~2km transmission, RoHS compliant)

Members of Flexon™ Family



Features

- ◆ Up to 155.52Mbps bi-directional data links
- ◆ 850nm VCSEL laser
- ◆ Multi-source package with LC optical interface
- ◆ With Spring-Latch for high density application
- ◆ Class 1 laser product
- ◆ 2km transmission distance with 50/125µm MMF or 1km with 62.5/125µm MMF
- ◆ Low EMI and excellent ESD protection
- ◆ Single +3.3V power supply
- ◆ Hot-pluggable capability
- ◆ Detailed product information in EEPROM
- ◆ Operating case temperature: 0 to +70°C

Applications

- ◆ SDH/STM-1, SONET/OC-3, ATM
- ◆ 100Base Fast Ethernet
- ◆ Other optical links

Standard

- ◆ Compatible with SFP MSA
- ◆ Compatible with FCC 47 CFR Part 15, Class B
- ◆ Compatible with FDA 21 CFR 1040.10 and 1040.11, Class I

Description

FTM-8001C-SLG SFP transceiver is compatible with the SFP Multi-Source Agreement. It is designed to provide SDH/SONET/ATM compatible links at a data rate of 155.52Mbps.

The transmitter section of FTM-8001C-SLG incorporates a highly reliable 850nm VCSEL laser, and the receiver section consists of a PIN photodiode mounted together with a trans-impedance preamplifier (TIA). All modules satisfy Class 1 Laser Safety requirements.

This transceiver enables cost-effective data transmission at a distance of 2km with 50/125µm multi-mode fiber or 1km with 62.5/125µm multi-mode fiber .

FTM-8001C-SLG features an EEPROM that contains the detailed product information stored for retrieval by host equipment. This information is accessed via the two-wire serial CMOS EEPROM protocol. For further information, please refer to SFP Multi-Source Agreement (MSA).

FTM-8001C-SLG is compliant with RoHS.

Regulatory Compliance

The transceivers have been tested according to American and European product safety and electromagnetic compatibility regulations (See Table 1). For further information regarding regulatory certification, please refer to Fiberxon regulatory specification and safety guidelines, or contact Fiberxon, Inc. America sales office listed at the end of the documentation.

Table 1 - Regulatory Compliance

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1(>500 V)
Electrostatic Discharge (ESD) to the Duplex 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
Immunity	IEC 61000-4-3	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.
Component Recognition	UL and CSA	Compatible with standards
RoHS	2002/95/EC 4.1&4.2	Compliant with standards

Absolute Maximum Ratings

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

Table 2 - Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T_s	-40	+85	°C
Supply Voltage	V_{CC}	-0.5	3.6	V
Operating Relative Humidity	-	5	95	%

Recommended Operating Conditions

Table 3 - Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	T_c	0		+70	°C
Power Supply Voltage	V_{CC}	3.13		3.47	V
Power Supply Current	I_{CC}			300	mA
Data Rate			155.52		Mbps

Optical and Electrical Characteristics

Table 4 - Optical and Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter						
Centre Wavelength	λ_C	830		860	nm	
Spectral Width (RMS)	σ			0.85	nm	
Average Output Power	P_{Out}	-10		-4	dBm	1
Extinction Ratio	EX	9			dB	
P_{Out} @TX Disable Asserted				-30	dBm	
Rise/Fall Time	t_r/t_f			2.5	ns	
Output Optical Eye	ITU-T G.957 compliant					2
Data Input Swing Differential	V_{IN}	300		1860	mV	3
Input Differential Impedance	Z_{IN}	90	100	110	Ω	
TX Disable	Disable	2.0		$V_{CC}+0.3$	V	
	Enable	0		0.8	V	
TX Fault	Fault	2.0		$V_{CC}+0.3$	V	
	Normal	0		0.8	V	
TX Disable Assert Time	t_{off}			10	μs	
Receiver						
Centre Wavelength	λ_C	760		860	nm	
Receiver Sensitivity				-25	dBm	4
Receiver Overload		0			dBm	
LOS De-Assert	LOS_D			-26	dBm	
LOS Assert	LOS_A	-40			dBm	
LOS Hysteresis		0.5		4	dB	
Data Output Swing Differential	V_{OUT}	370		2000	mV	5
LOS	High	2.0		$V_{CC}+0.3$	V	
	Low	0		0.8	V	
Rise/Fall Time	t_r/t_f			2.2	ns	

Notes:

1. The optical power is launched into MMF.
2. Measured with a PRBS $2^{23}-1$ test pattern @155.52Mbps.
3. Internally AC-coupled and terminated to 100 Ω differential load.
4. Measured with a PRBS $2^{23}-1$ test pattern @155.52Mbps, BER better than or equal to 1×10^{-10}
5. Internally AC coupled, should be terminated with 100 Ω (differential).

EEPROM Information

The SFP MSA defines a 256-byte memory map in EEPROM describing the transceiver's capabilities, standard interfaces, manufacturer, and other information, which is accessible over a two-wire serial interface at the 8-bit address 1010000X (A0h). The memory contents refer to Table 5.

Table 5 - EEPROM Serial ID Memory Contents (A0h)

Addr.	Field Size (Bytes)	Name of Field	Hex	Description
0	1	Identifier	03	SFP
1	1	Ext. Identifier	04	MOD4
2	1	Connector	07	LC
3—10	8	Transceiver	00 00 01 00 00 00 00 00	OC 3, Multi-mode short reach
11	1	Encoding	03	NRZ
12	1	BR, nominal	02	155Mbps
13	1	Reserved	00	
14	1	Length (9um)-km	00	
15	1	Length (9um)	00	
16	1	Length (50um)	02	2km
17	1	Length (62.5um)	01	1km
18	1	Length (copper)	00	
19	1	Reserved	00	
20—35	16	Vendor name	46 49 42 45 52 58 4F 4E 20 49 4E 43 2E 20 20 20	"FIBERXON INC." (ASC II)
36	1	Reserved	00	
37—39	3	Vendor OUI	00 00 00	
40—55	16	Vendor PN	46 54 4D 2D 38 30 30 31 43 2D 53 4C 47 20 20 20	"FTM-8001C-SLG" (ASC II)
56—59	4	Vendor rev	xx xx 00 00	ASC II ("31 30 00 00" means 1.0 revision)
60—62	3	Reserved	00 00 00	
63	1	CC BASE	xx	Check sum of bytes 0 - 62
64—65	2	Options	00 1A	LOS, TX_FAULT and TX_DISABLE
66	1	BR, max	00	
67	1	BR, min	00	
68—83	16	Vendor SN	xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx	ASC II
84—91	8	Vendor date code	xx xx xx xx xx xx 20 20	Year (2 bytes), Month (2 bytes), Day (2 bytes)
92—94	3	Reserved	00 00 00	
95	1	CC EXT	xx	Check sum of bytes 64 - 94
96—255	160	Vendor specific		All are set to 0

Note: The "xx" byte should be filled in according to practical case. For more information, please refer to the related document of *SFP Multi-Source Agreement (MSA)*.

Recommended Host Board Power Supply Circuit

Figure 1 shows the recommended host board power supply circuit.

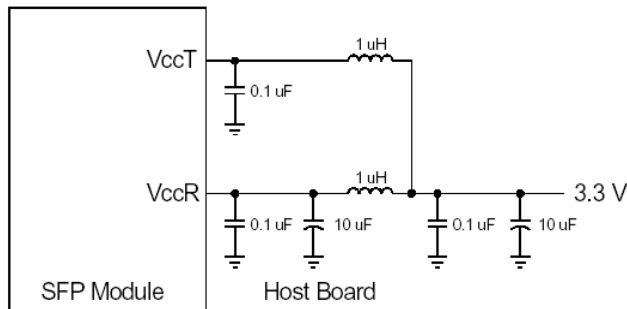


Figure 1, Recommended Host Board Power Supply Circuit

Recommended Interface Circuit

Figure 2 shows the recommended interface circuit.

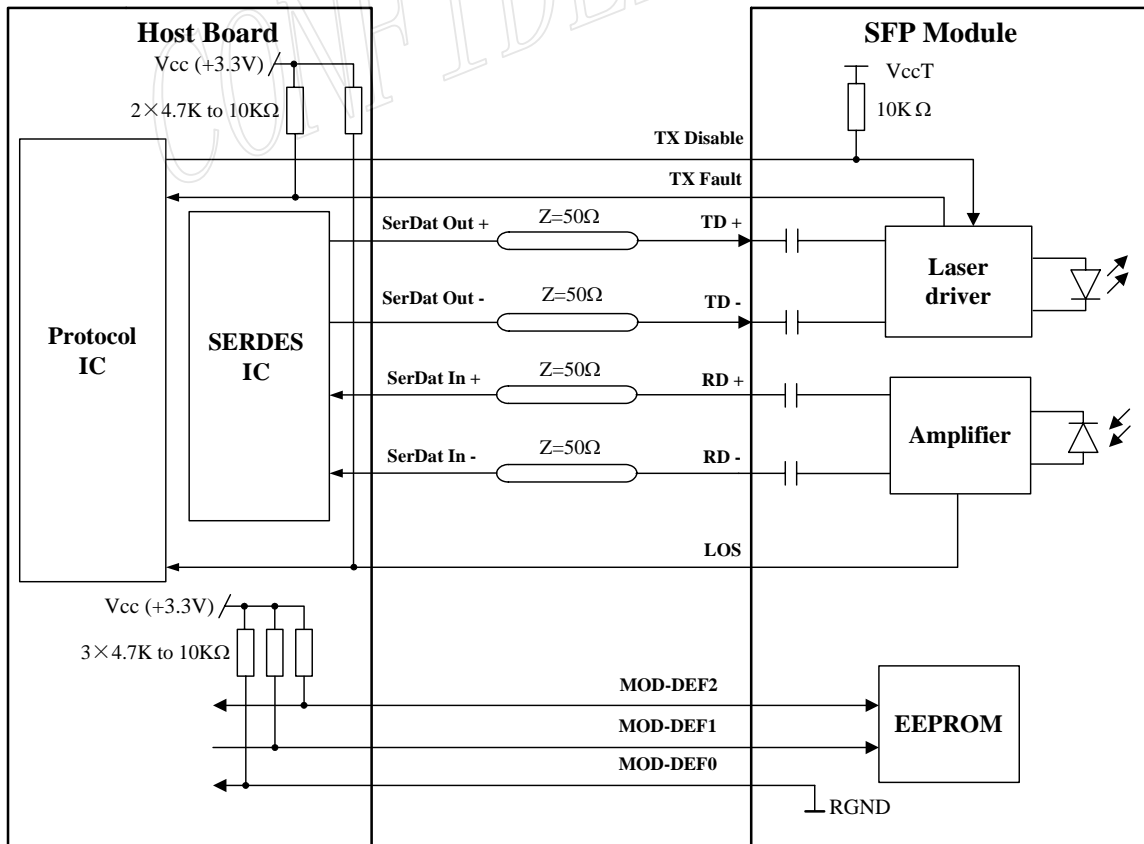


Figure 2, Recommended Interface Circuit

Pin Definitions

Figure 3 below shows the pin numbering of SFP electrical interface. The pin functions are described in Table 6 with some accompanying notes.

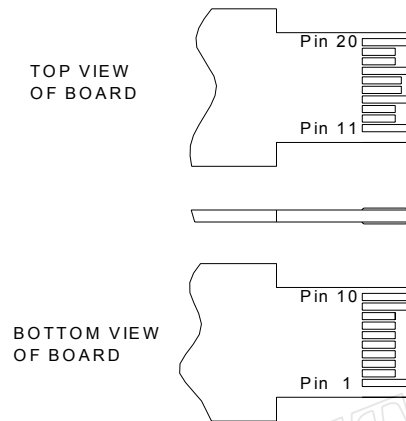


Figure 3, Pin View

Table 6 – Pin Function Definitions

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

Notes:

- TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host

board to a voltage between 2.0V and $V_{cc}+0.3V$. 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.

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 4.7k~10k Ω resistor. Its states are:

Low (0~0.8V):	Transmitter on
(>0.8V, <2.0V):	Undefined
High (2.0~3.465V):	Transmitter Disabled
Open:	Transmitter Disabled
3. MOD-DEF 0,1,2 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 V_{ccT} or V_{ccR} .
 MOD-DEF 0 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. LOS 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 $V_{cc}+0.3V$. 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.
5. These are the differential receiver output. They are internally AC-coupled 100 Ω differential lines which should be terminated with 100 Ω (differential) at the user SERDES.
6. These are the differential transmitter inputs. They are AC-coupled, differential lines with 100 Ω differential termination inside the module.

Mechanical Design Diagram

The mechanical design diagram is shown in Figure 4.

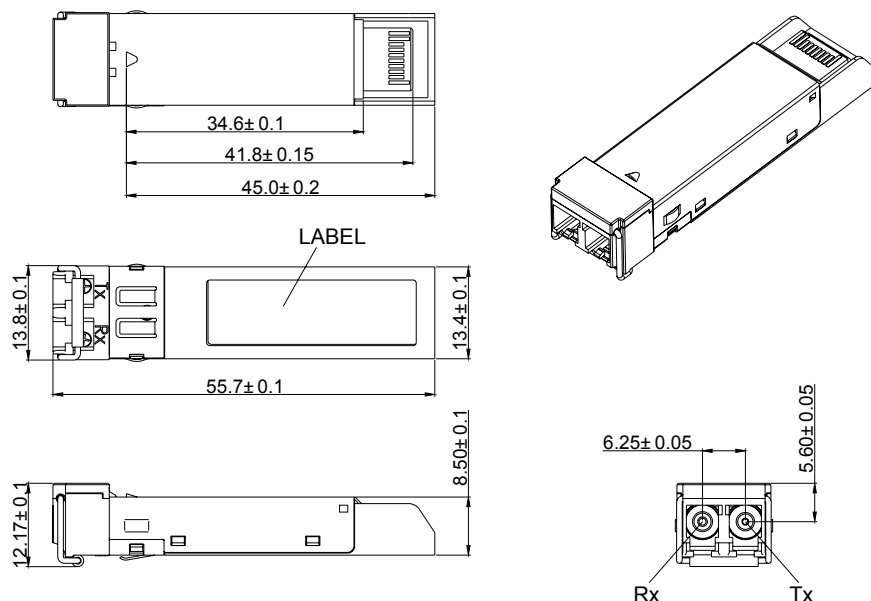
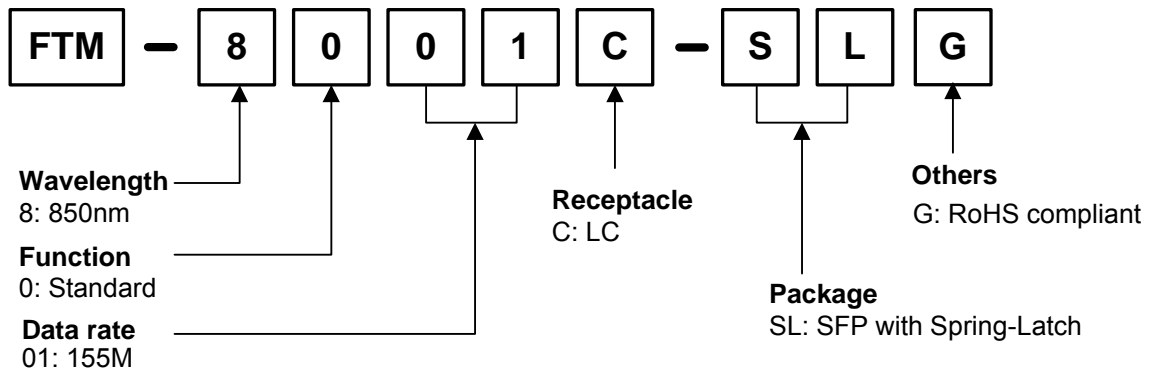


Figure 4, Mechanical Design Diagram of the SFP with Spring-Latch

Ordering information



Part No.	Product Description
FTM-8001C-SLG	850nm, 155.52Mbps, 1~2km with MMF, SFP with Spring-Latch, RoHS compliant, 0°C~+70°C

Related Documents

For further information, please refer to the following documents:

- *Fiberxon SFP Installation Guide*
- *Fiberxon SFP Application Notes*
- *SFP Multi-Source Agreement (MSA)*

Obtaining Document

You can visit our website:

<http://www.fiberxon.com>

Or contact Fiberxon, Inc. America Sales Office listed at the end of the documentation for get the latest documents.

Revision History

Revision	Initiate	Review	Approve	Subject	Release Date
Rev. 1a	Univer.Yang	Simon.Jang	Walker.Weii	Initial datasheet	May. 09, 2006

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