

LS-MM852M-02I

SFP 2Mbps Transceiver Module

Product Features

- VCSEL/FP Laser Diode Transmitter
- Up to 2Km on OM3 MMF
- 3.3V power supply
- LC duplex optical interface
- LVTTL Inputs /Outputs and LVTTL signal detect
- Compatible with IEEE C37.94/IEC 62843 Standard
- Operating case temperature range

Standard: 0 to +70°C

Industrial: -40 to +85°C

Application

- RS232/RS485/RS422 receptacle fiber transmission Fiber System



Product Description

These series of transceiver modules are the perfect solution for ultra-low speed communication networks. These transceiver modules support data rates up to 2Mbps.

The module is fully compliant with Small Form-Factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA).

These transceiver modules provides the system designer with products to RS232/RS485/RS422 receptacle fiber transmission.

Absolute Maximum Ratings

Operating of the transceiver beyond the Absolute Conditions Listed in Table 1 will degrade or damage the product. It's not implied that the product would function above the recommended operating environment, it's possible to reduce the reliability and lifetime of device if Recommended Operating Environment is exceeded (Refer to table 2)

Table 1-- Absolute Maximum Conditions

Parameter	Symbol	Min	Max	Units	Note
Storage Temperature	T _{ST}	-40	+85	°C	-
Relative Humidity	RH	5	95	%	-
Supply Voltage	V _{CC}	0	+3.6	V	-

Table 2-- Recommended Operating Environment and Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Units	Note
Supply Voltage	V _{CC}	+3.1	+3.3	+3.5	V	-
Supply Current	I _{CC}	-	-	240	mA	-
Operating Case Temperature	TOP	0	-	+70	°C	<u>1</u>
		-40	-	+85		2
Data Rate	B	0	-	2	Mbps	-

Note1: Standard level

Note2 :Industrial level

Optical Parameters

Table 3-- LS-MM852M-02x Transceiver Characteristics

Ambient Operating Temperature Ta=+25±5°C, VCC = 3.3±0.2V

Parameter	Symbol	Min	Typ	Max	Units	Note
Transmitter						
Data rate	B	DC	-	2	Mbps	-
Output Center Wavelength	λ _c	830	850	860	nm	-
Output Spectral width (RMS)	λ	-	-	0.85	nm	-
Average Optical Output Power	P _o	-14	-	-5	dBm	1,2
Extinction Ratio	ER	10	-	-	dB	1,2

Receiver							
Receiver Sensitivity		S	-	-	-27	dBm	1,2
Maximum Input Power		P _{MAX}	-5	-	-	dBm	1,2
Operation Center Wavelength		λ _c	770	-	860	nm	-
Loss pf Signal	Assert	LOS _A	-36	-	-	dBm	1,2
	Deassert	LOS _D	-	-	-27	dBm	1,2
LOS Hysteresis		LOSHYS	0.5	-	-	dB	-

Note1: The optical power is launched into 62.5/125 μ m MMF.

Note2: With 2Mbps.

Table 4-- LS-SM312M-20x Transceiver Optical Characteristics

Ambient Operating Temperature Ta=+25 $\pm$ 5°C, VCC = 3.3 $\pm$ 0.2V

Parameter		Symbol	Min	Typ	Max	Units	Note
Transmitter							
Data rate		B	0	-	2	Mbps	-
Output Center Wavelength		λ_C	1260	1310	1360	nm	-
Output Spectral width (RMS)		λ	-		4.0	nm	-
Average Optical Output Power		P _O	-14	-	-5	dBm	1,2
Extinction Ratio		ER	10	-	-	dB	-
Receiver							
Receiver Sensitivity		P _{Min}	-	-	-30	dBm	1,2
Maximum Input Power		P _{MAX}	-3	-	-	dBm	1,2
Operation CenterWavelength		λ_c	1260	-	1620	nm	-
LOSS of signal	Assert	LOS _A	-45	-	-	dBm	1,2
	Deassert	LOS _D	-	-	-30	dBm	1,2
LOS Hysteresis		LOSHYS	0.5	-	-	dB	-

Note1: The optical power is launched into 9/125 μ m SMF.

Note2: With 2Mbps.

Table 5-- LS-SM312M-40x Transceiver Optical Characteristics

Ambient Operating Temperature Ta=+25 $\pm$ 5°C, VCC = 3.3 $\pm$ 0.2V

Parameter	Symbol	Min	Typ	Max	Units	Note
Transmitter						
Data rate	B	0	-	2	Mbps	-
Output Center Wavelength	λ_C	1260	1310	1360	nm	-
Output Spectral width (RMS)	λ	-		4.0	nm	-
Average Optical Output Power	P _O	-10	-	-3	dBm	1,2

Extinction Ratio	ER	10	-	-	dB	-
Receiver						
Receiver Sensitivity	S	-	-	-30	dBm	1,2
Maximum Input Power	P _{MAX}	-3	-	-	dBm	1,2
Operation Center Wavelength	λ_c	1260	-	1620	nm	-
Loss of Signal	Assert	LOS _A	-45	-	dBm	1,2
	Deassert	LOS _D	-	-30	dBm	1,2
LOS Hysteresis		LOSHYS	0.5	-	dB	-

Note1: The optical power is launched into 9/125 μ m SMF.

Note2: With 2Mbps.

Table 6-- LS-SM312M-60x Transceiver Optical Characteristics

Ambient Operating Temperature Ta=+25 $\pm$ 5 $^{\circ}$ C, VCC = 3.3 $\pm$ 0.2V

Parameter	Symbol	Min	Typ	Max	Units	Note
Transmitter						
Data rate	B	0	-	2	Mbps	-
Output Center Wavelength	λ_C	1260	1310	1360	nm	-
Output Spectral width (RMS)	λ	-		4.0	nm	-
Average Optical Output Power	P _o	-5	-	0	dBm	1,2
Extinction Ratio	ER	10	-	-	dB	-
Receiver						
Receiver Sensitivity	S	-	-	-34	dBm	1,2
Maximum Input Power	P _{MAX}	-3	-	-	dBm	1,2
Operation Center Wavelength	λ_c	1260	-	1620	nm	-
Loss of Signal	Assert	LOS _A	-45	-	dBm	1,2
	Deassert	LOS _D	-	-34	dBm	1,2
LOS Hysteresis		LOSHYS	0.5	-	dB	-

Note1: The optical power is launched into 9/125 μ m SMF.

Note2: With 2Mbps.

Table 7-- LS-SM312M-80x Transceiver Optical Characteristics

Ambient Operating Temperature Ta=+25 $\pm$ 5 $^{\circ}$ C, VCC = 3.3 $\pm$ 0.2V

Parameter	Symbol	Min	Typ	Max	Units	Note
Transmitter						
Data rate	B	0	-	2	Mbps	-
Output Center Wavelength	λ_C	1520	1550	1580	nm	-
Output Spectral width (RMS)	λ	-		1.0	nm	-

Average Optical Output Power		Po	-5	-	0	dBm	1,2
Extinction Ratio		ER	10	-	-	dB	-
Receiver							
Receiver Sensitivity		S	-	-	-34	dBm	1,2
Maximum Input Power		P _{MAX}	-3	-	-	dBm	1,2
Operation Center Wavelength		λ_c	1260	-	1620	nm	-
Loss of Signal	Assert	LOS _A	-45	-	-	dBm	1,2
	Deassert	LOS _D	-	-	-34	dBm	1,2
LOS Hysteresis		LOSHYS	0.5	-	-	dB	-

Note1: The optical power is launched into 9/125 μ m SMF.

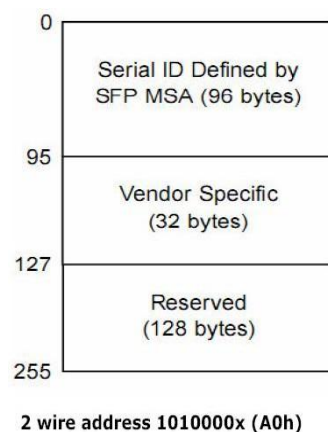
Note2: With 2Mbps.

EEPROM Information Functions

The standard SFP serial ID provides access to identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information.

Additionally, SFP transceivers provide a unique enhanced digital diagnostic monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, and 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 E²PROM that is accessible over a 2-wire serial interface at the 8 bit address 1010000X (A0h).



EPROM Serial ID Memory Contents:

Table 8-- Serial ID Memory Map:A0h

Data Address	Size (Byte)	Name of Field	Description
Base ID Fields			
0	1	Identifier	SFP
1	1	Ext. Identifier	SFP function is defined by serial ID only
2	1	Connector	LC Connector
3-10	8	Transceiver	Transceiver Codes
11	1	Encoding	NRZ
12	1	BR, Nominal	0Mbps
13	1	Reserved	
14	1	Length(9μm)km	Transceiver transmit distance
15	1	Length(9μm)100m	
16	1	Length(50μm)10m	
17	1	Length(62.5μm)10m	
18	1	Length(Copper)	Not compliant
19	1	Reserved	
20-35	16	Vendor Name	SFP vendor name: Neton
36	1	Reserved	
37-39	3	Vendor OUI	
40-55	16	Vendor PN	
56-59	4	Vendor rev	3.0
60-61	2	Wavelength	Transceiver wavelength
62	1	Reserved	
63	1	CC_BASE	Check code for Base ID Fields
Extended ID Fields			
64-65	2	Options	TX_FAULT, TX_DISABLE and Loss of Signal implemented.
66	1	BR, max	
67	1	BR, min	
68-83	16	Vendor SN	Serial number
84-91	8	Date code	Manufactory date code
92	1	Diagnostic Monitoring Type	Digital diagnostic monitoring implemented,"internally calibrated" is implemented, RX measurement type is "Average Power".

93	1	Enhanced Options	Optional Alarm/Warning flags implemented for all monitored quantities, Optional Soft RX_LOS monitoring implemented.
94	1	SFF-8472 Compliance	Includes functionality described in Rev 9.3 SFF-8472.
95	1	CC_EXT	Check sum for the extended ID Fields
Vendor Specific ID Fields			
96-127	32	Vendor Specific	Vendor Specific EEPROM
128-255	128	Reserved	Reserved for SFF-8079

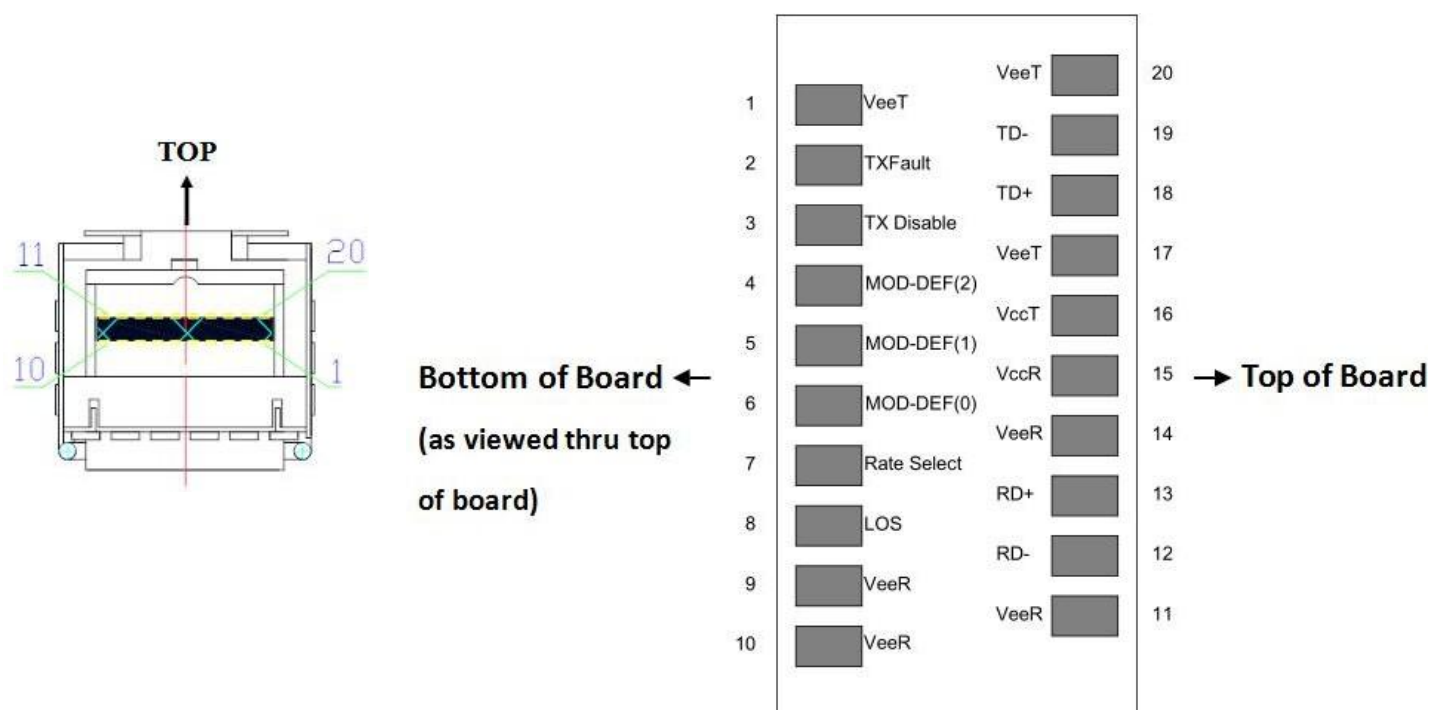


Table 9—Connector Pin Function Definitions

Pin #	Pin Name	Plug seq	Description	Note
1	VeeT	1	Transmitter Ground	5
2	TX Fault	3	Not in used	3
3	TX Disable	3	Transmitter Disable	1
4	MOD_DEF(2)	3	SDA Serial Data Signal	2
5	MOD_DEF(1)	3	SCL Serial Clock Signal	2
6	MOD_DEF(0)	3	Grounded to indicate that the module is present	2
7	Rate Select	3	Not in used	3

8	LOS	3	Loss of Signal	4
9	VeeR	1	Receiver Ground	5
10	VeeR	1	Receiver Ground	5
11	VeeR	1	Receiver Ground	5
12	RD-	3	Not in used	3
13	RD+	3	Received Data Out	-
14	VeeR	1	Receiver Ground	5
15	VccR	2	Receiver Power	6
16	VccT	2	Transmitter Power	6
17	VeeT	1	Transmitter Ground	5
18	TD+	3	Transmit Data In	-
19	TD-	3	Not in used	3
20	VeeT	1	Transmitter Ground	5

Plug Seq.: Pin engagement sequence during hot plugging.

Note:

1. TX_Disable is an input that is used to shut down the transmitter optical output. Its states are:

Low (0 – 0.8V): Transmitter on (>0.8, < 2.0V): Undefined
 High (2.0 – VCC):
 Transmitter Disabled Open:
 Transmitter
 Disabled

2. Mod-Def 0, 1, 2. These are the module definition pins. They should be pulled up with a 4.7KΩ—10KΩ resistor on the host board. The pull-up voltage shall be VCC_T or VCC_R.

Mod-Def 0 is 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

3. Not in used.

4. LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7KΩ—10KΩ resistor. Pull up voltage between 2.0V and VCC_T, R+0.3V. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.

5. VeeR and VeeT may be internally connected within the SFP module.

6. VCC_R and VCC_T are the receiver and transmitter power supplies. They are defined as 3.3V ±5% at the SFP connector pin. Maximum supply current is 300 mA.

Host Board Layout

A typical host board mechanical layout for attaching the SFP Connector and Cage System is shown in Figures 1 and 2.

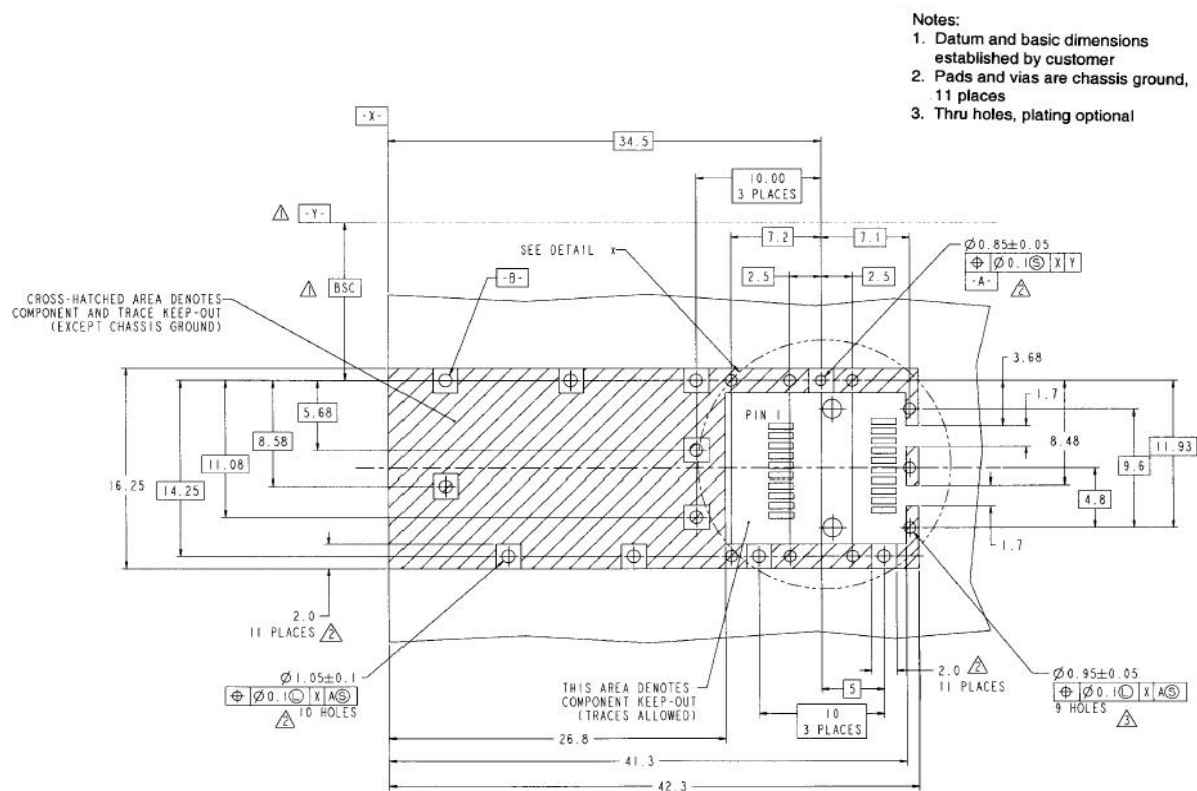


Figure 1 SFP Host Board Mechanical Layout

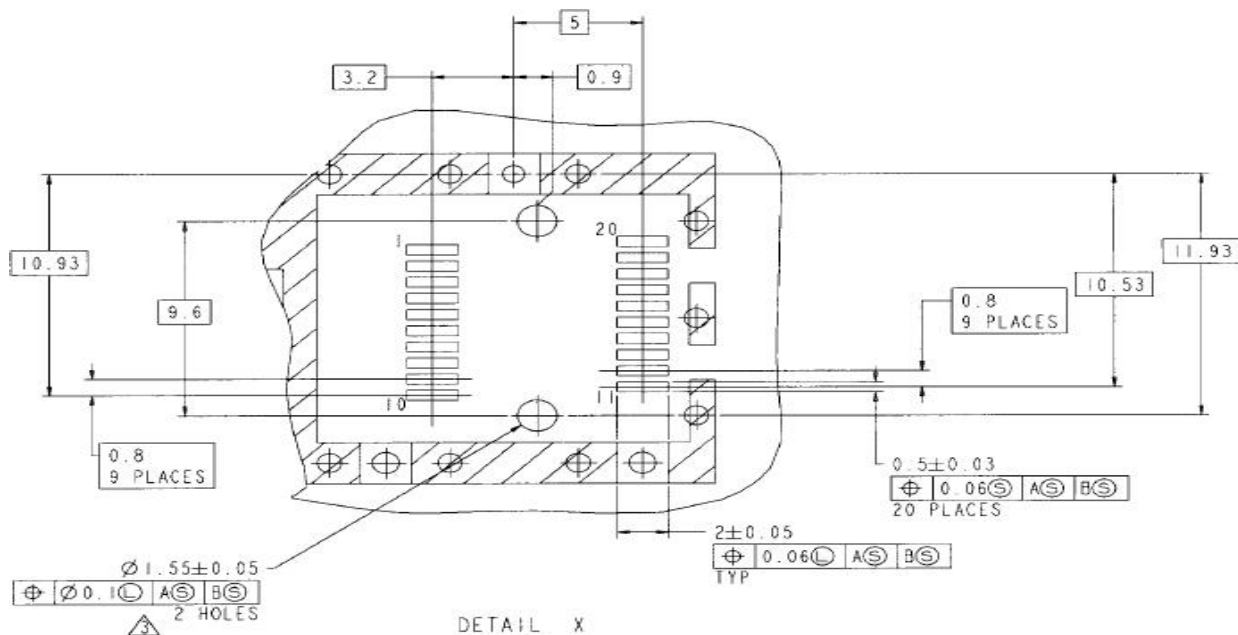


Figure 2 SFP Host Board Mechanical Layout (Cont.)

Recommended Circuit Schematic

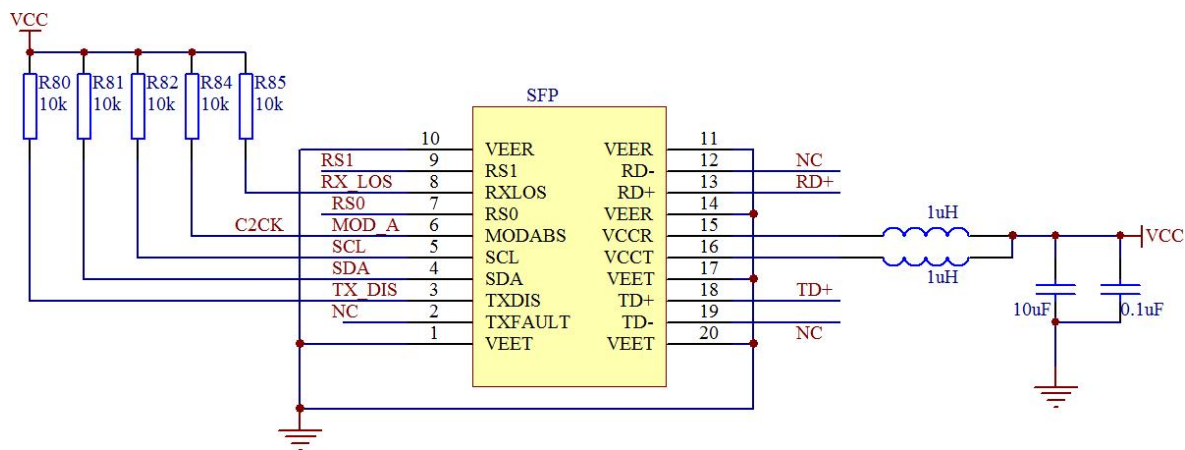


Figure 3 Recommended Circuit Schematic

Module Outline Drawing

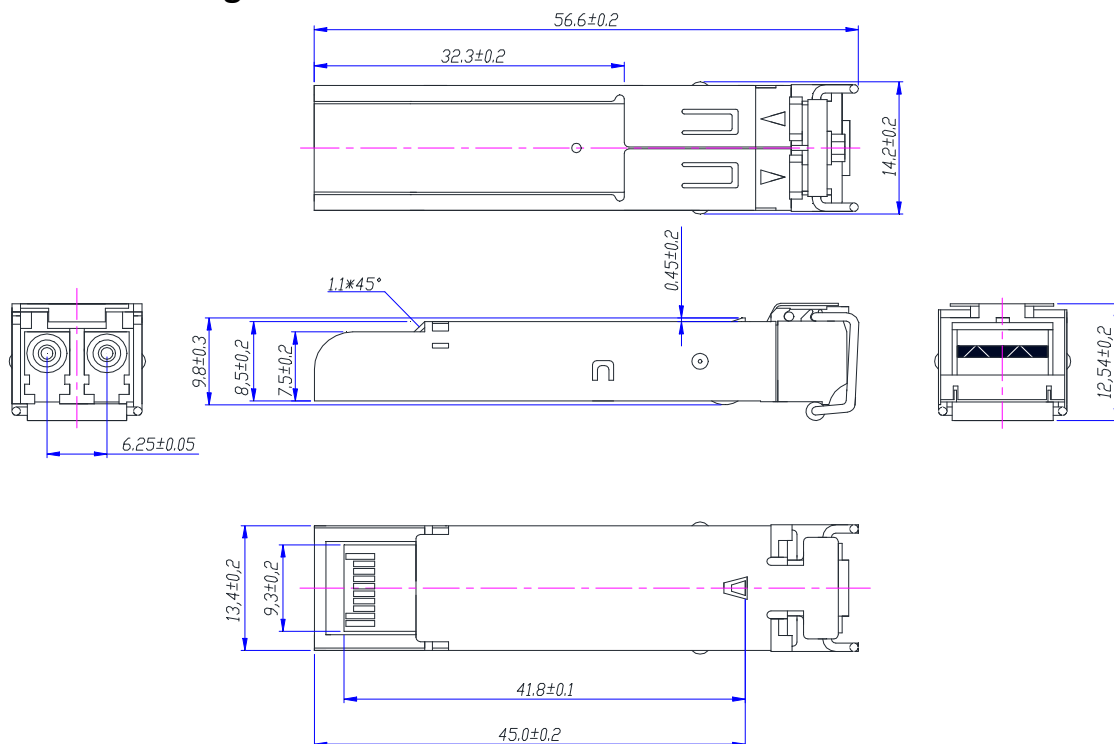


Figure 4 LC TYPE

Order Information

Type	Fiber Type	Wavelength(nm)	Fiber Length(KM)	Operating temperature
LS-MM852M-02C	MM	850(VCSEL)	2	0 to+70℃
LS-MM852M-02I	MM	850(VCSEL)	2	-40℃ to +85℃
LS-SM312M-20C	SM	1310(FP)	20	0 to+70℃
LS-SM312M-20I	SM	1310(FP)	20	-40℃ to +85℃
LS-SM312M-40C	SM	1310(FP)	40	0 to+70℃
LS-SM312M-40I	SM	1310(FP)	40	-40℃ to +85℃
LS-SM312M-60C	SM	1310(FP)	60	0 to+70℃
LS-SM312M-60I	SM	1310(FP)	60	-40℃ to +85℃
LS-SM552M-80C	SM	1550(FP)	80	0 to+70℃
LS-SM552M-80I	SM	1550(FP)	80	-40℃ to +85℃