

# LSP-M85-02D

## SFP28 25Gb/s 850nm DDM Transceiver

### PRODUCT FEATURES

- Up to 25.7813Gbps Data Links
- 850nm VCSEL laser transmitter and PIN receiver
- Maximum link length of 70m on OM3 Multimode Fiber(MMF) and 100m ON OM4 MMF
- Hot-pluggable SFP28 footprint
- Duplex LC receptacles
- Low power dissipation
- RoHS compliant and lead-free
- Support Digital Diagnostic Monitor interface
- Single +3.3V power supply
- 0°C to +70°C case operating temperature



### APPLICATIONS

- 25GBASE-LR Ethernet

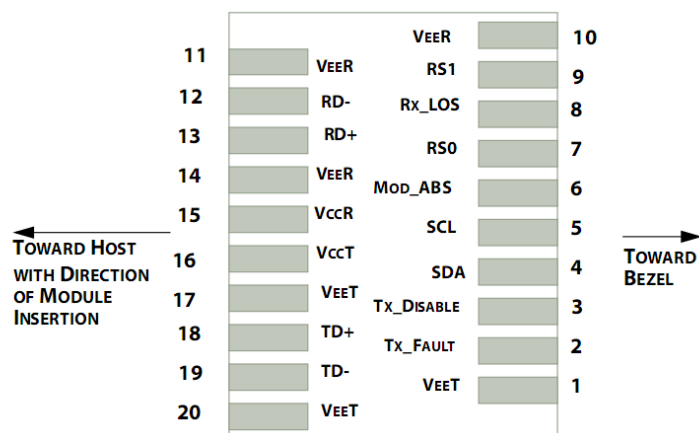
### Compliance

- SFF-8472
- SFF-8402
- SFF-8432
- SFF-8431

### Ordering information

Package	Product part NO.	Distance	Temperature Range
SFP28	LSP-M85-02D	70M OM3/100M OM4	0~70°C

## I. Pin Diagram



Pinout of Connector Block on Host Board

## II. Pin Descriptions

Pin	Symbol	Name/Description	Ref.
1	$V_{EET}$	Transmitter Ground (Common with Receiver Ground)	1
2	$T_{FAULT}$	Transmitter Fault.	2
3	$T_{DIS}$	Transmitter Disable. Laser output disabled on high or open.	3
4	SDA	2-wire Serial Interface Data Line	4
5	SCL	2-wire Serial Interface Clock Line	4
6	MOD_ABS	Module Absent. Grounded within the module	4
7	RS0	No connection required	
8	LOS	Loss of Signal indication. Logic "0" indicates normal operation.	5
9	RS1	No connection required	
10	$V_{EER}$	Receiver Ground (Common with Transmitter Ground)	1
11	$V_{EER}$	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled	
13	RD+	Receiver Non-inverted DATA out. AC Coupled	
14	$V_{EER}$	Receiver Ground (Common with Transmitter Ground)	1
15	$V_{CCR}$	Receiver Power Supply	
16	$V_{CCT}$	Transmitter Power Supply	
17	$V_{EET}$	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	$V_{EET}$	Transmitter Ground (Common with Receiver Ground)	1

#### Notes:

1. Circuit ground is internally isolated from chassis ground.
2. TFAULT is an open collector/drain output, which is pulled up with a 4.7k $\Omega$  – 10k $\Omega$  resistor on the host board, but is grounded inside the SFP+ cable plug.
3. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
4. Should be pulled up with 4.7k $\Omega$  – 10k $\Omega$  on host board to a voltage between 2.0V and 3.6V.  
MOD\_ABS pull line low to indicate module is plugged in.
5. LOS is open collector output. Should be pulled up with 4.7k $\Omega$  – 10k $\Omega$  on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

### III. Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Maximum Supply Voltage	Vcc	-0.5		3.6	V	
Storage Temperature	TS	-40		85	°C	1
Case Operating Temperature	TOP	0		70	°C	
Relative Humidity	RH	0		85	%	2

#### Notes:

- 1.Limited by the fiber cable jacket, not the activeends.
- 2.Non-condensing.

#### IV. Optical Characteristics (TOP = 0°C to 70°C, VCC = 3.3 ± 5% Volts)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Transmitter						
Center Wavelength	$\lambda_c$	840	850	860	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Spectral Width	Pm			1	nm	
Average Output Power	Pavg	-8.4		2.4	dBm	
Optical Modulation Amplitude (OMA)	Poma	-6.4		3	dBm	
Extinction Ratio	ER	2			dB	
Transmitter Dispersion Penalty	TDEC			4.3	dB	
Optical Return Loss Tolerance	TOL			20	dB	
Transmitter OFF Output Power	POff			-30	dBm	
Transmitter eye mask definition {X1,X2,X3,Y1,Y2,Y3}, Hit ratio 1.5E-3		{ 0.3, 0.38, 0.45, 0.35, 0.41, 0.5 }				
Receiver						
Center Wavelength	$\lambda_c$	840	850	860	nm	
Receiver Stress Sensitivity, OMA				-5.2	dBm	
Receiver Sensitivity, Average Power				-10.3	dBm	
Receiver Reflectance	Rfl			-26	dBm	
Loss of Signal Assert	P <sub>A</sub>	-30			dBm	
Loss of Signal De-assert	P <sub>D</sub>			-13	dBm	
LOS Hysteresis	P <sub>D</sub> - P <sub>A</sub>	0.5			dB	

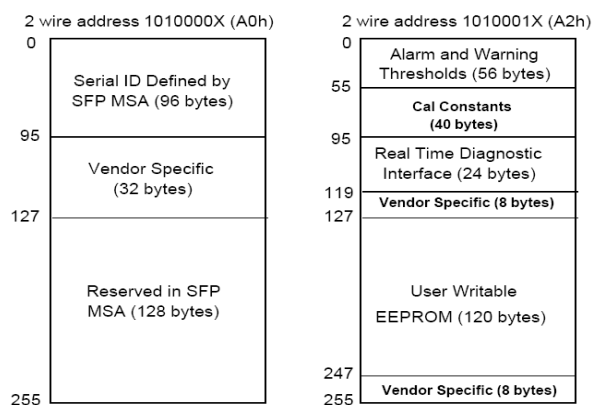
## V. Electrical Characteristics (TOP = 0°C to 70°C, VCC = 3.3 ± 5% Volts)

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
SupplyVoltage	V <sub>CC</sub>	3.135	3.3	3.465	V	
SupplyCurrent	I <sub>CC</sub>			300	mA	
<b>Transmitter</b>						
Input differential impedance	R <sub>in</sub>		100			1
Differential data input swing	V <sub>in,pp</sub>	100		800	mV	
Transmit Disable Voltage	V <sub>D</sub>	2		V <sub>CC</sub>	V	
Transmit Enable Voltage	V <sub>EN</sub>	V <sub>EE</sub>		V <sub>EE</sub> +0.8	V	
<b>Receiver</b>						
Differential data output swing	V <sub>out,pp</sub>	100		400	mV	2
LOS Fault	V <sub>LOS_fault</sub>	2		V <sub>CC</sub> HOST	V	3
LOS Normal	V <sub>LOS_norm</sub>	V <sub>EE</sub>		V <sub>EE</sub> +0.8	V	3
Power Supply Noise Tolerance	V <sub>CC</sub> T/V <sub>CC</sub> R	Per SFF-8431 Rev 4.1			mVpp	4

### 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 in sequence in the PRBS^9 is an acceptable alternative. SFF-8431 Rev 4.1
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. Maximum pull-up voltage is 5.5V.
5. Testing methodology per SFF-8431. Rev 4.1.

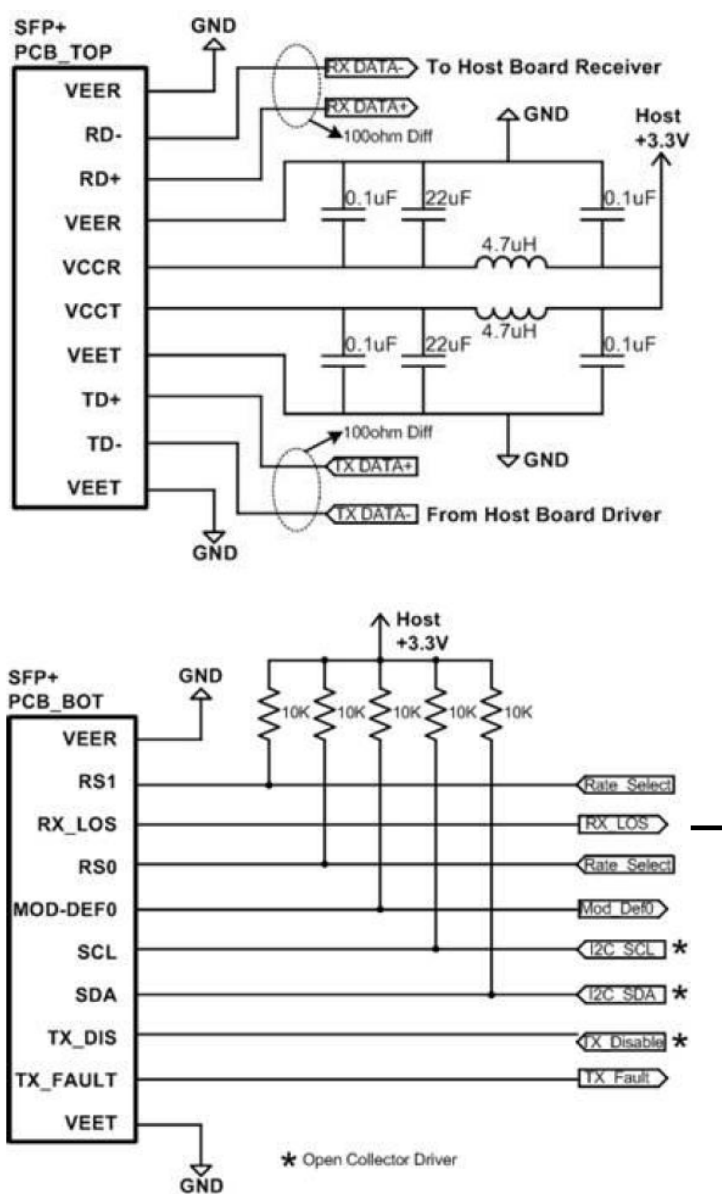
## VI. Digital Diagnostic Memory Map



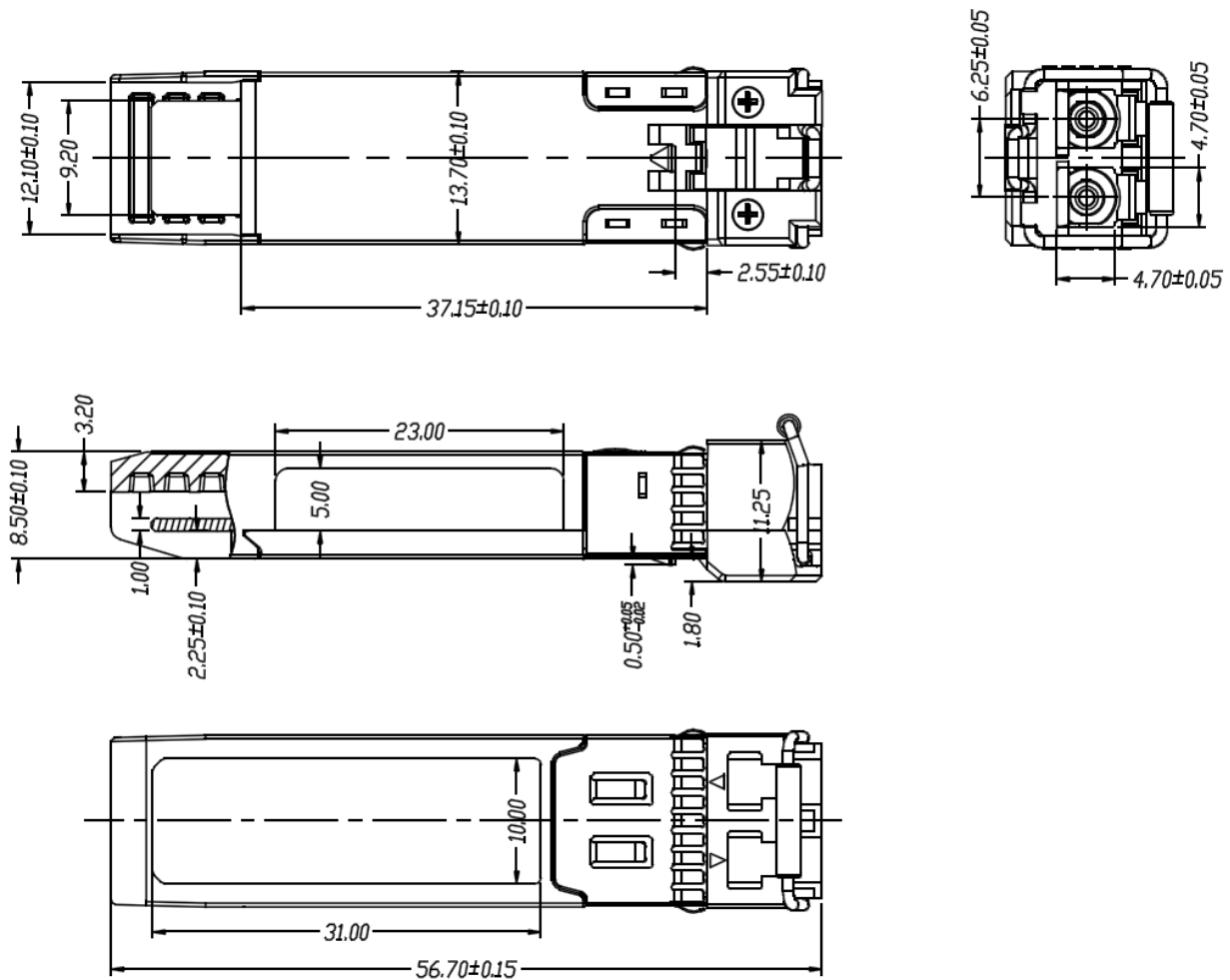
## VII. Digital Diagnostic Monitoring Information

Parameter	Unit	Accuracy
Case Temperature	°C	±3
Supply Voltage	V	±3%
Tx Bias Current	mA	±10%
Tx Optical Power	dB	±3
Rx Optical Power	dB	±3

## VIII. Recommended Interface Circuit



## IX. Mechanical Dimensions



SFP wire mechanical drawing(Unit: mm)

## Revision History

Version No.	Date	Description
1.0	Dec.12, 2019	Preliminary datasheet