

## 25G SFP28 100m SR Transceiver Specification

### HTS28-85X1-M1BD

#### **Feature**

- ◆ Compliant to SFP+ MSA
- ◆ Compliant to IEEE802.3by
- ◆ Fully RoHS Compliant
- ◆ All metal housing for superior EMI performance
- ◆ Operating data rate up to 25.78Gbps
- ◆ High sensitivity Pin photodiode and TIA
- ◆ Up to 70m transmission on MMF OM3 and 100m transmission on MMF OM4
- ◆ LC duplex connector
- ◆ Hot pluggable 20pin connector
- ◆ Low power consumption <1 W
- ◆ Single +3.3V power supply
- ◆ Digital Monitoring SFF-8472 compliant
- ◆ I2C management interface
- ◆ 0°C to +70°C case operating temperature

#### **Applications**

- ◆ 25G-SR
- ◆ Other high speed data connections

#### **Standards**

- ◆ IEEE802.3by
- ◆ SFF-8431 SFF-8432 SFF-8472

#### **Description**

The Hirundo ' s HTS28-85X1-M1BD transceiver is designed to transmit and receive serial optical data over multi-mode optical fiber with 100m.They are compliant with SFF-8402, SFF-8431, SFF-8432,SFF-8472 and IEEE802.3by standard. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472.

## 1. Ordering Information

Table 1.1 Ordering Information

Part No.	Specifications							
	Package	Date rate (Gbps)	Wavelength (nm)	Optical Power (dBm)	Sensitivity (dBm)	Temp (°C)	Reach (m)	Connector
HTS28-85X1-M1BD	SFP28	25.78	850	-8.4~2.4	<-10.6	0~70	100	LC
PN	HTS28-85X1-M1BD							
Description	25Gbps,MMF,100m,0-70°C							
SAP No	-							
Customer PN	-							

## 2. Revision History

Table 2.1 Revision History

Version	Initiated	Reviewed	Revision	Date
V1.0	Leo	Virgil	LiuSJ	2020-11-8

## 3. Absolute Maximum Ratings and Recommended Operating Conditions

Table 3.1 Absolute Maximum Ratings

Parameter	Symbol	Unit	Min	Max
Storage Temperature Range	Ts	°C	-40	85
Relative Humidity	RH	%	5	85
Power Supply Voltage	Vcc	V	-0.5	4
Signal Input Voltage		V	-0.3	Vcc+0.3

Table 3.2 Recommended Operating Conditions

Parameter	Symbol	Unit	Min	Typ	Max
Operating Case Temperature	Tc	°C	0		70
Power Supply Voltage	Vcc	V	3.135	3.3	3.465
Bit Rate	BR	Gbps		25.78	
Bit Error Ratio	BER				5*10 <sup>-5</sup>
Max Supported Link Length(OM3)	L	m			70
Max Supported Link Length(OM4)	L	m			100

## 4. Optical Specification

**Table 4.1 Optical Specifications**

Parameter	Symbol	Unit	Min	Typ	Max	Notes
<b>Transmitter</b>						
Signaling rate per lane		Gbps		25.78		
Center wavelength	$\lambda_c$	nm	840		860	
RMS Spectral Width	SW	nm			0.6	
Optical Output Power	P <sub>out</sub>	dBm	-6.4		2.4	
Extinction Ratio	ER	dB	2			
Optical Power OMA	P <sub>OMA</sub>	dBm	-8.5			
Average Launch Power of OFF transmitter	P <sub>OFF</sub>	dBm			-30	
Relative Intensity Noise	R <sub>IN</sub>	dB/Hz			-128	
Transmitter Eye mask definition {X1,X2,X3, Y1,Y2,Y3}			Compliant with IEEE 802.3by			
<b>Receiver</b>						
Signaling rate per lane		Gbps		25.78		
Center wavelength	$\lambda_{IN}$	nm	840		860	
Receiver Sensitivity	R <sub>SENSE</sub>	dBm			-10.3	Note1
Receiver Overload	P <sub>in</sub>	dBm			3	
Receiver Reflectance	R <sub>fl</sub>	dB			-12	
LOS De-Assert	LOSD	dBm			-13	
LOS Assert	LOSA	dBm	-30			
LOS Hysteresis		dB	0.5		5	

Note1: Measured at ER>2dBm, PRBS 2<sup>31</sup>-1 test pattern, @25.78Gb/s, BER<5\*5<sup>-5</sup>.

## 5. Electrical Specification

**Table 5.1 Electrical Specifications**

Parameter	Symbol	Unit	Min	Typ	Max	Notes
Supply Voltage	VCC	V	3.14		3.46	
Supply Current	ICC	A			0.3	
Power Consumption	Pc	W			1	
<b>Transmitter</b>						
Signaling rate per lane		Gbps		25.78		
Input Differential Impedance	R <sub>IN</sub>	Ω	90	100	110	
Differential data input swing	V <sub>IN</sub>	mVp-p	200		600	
<b>Receiver</b>						
Signaling rate per lane		Gbps		25.78		
Output Differential Impedance	R <sub>OUT</sub>	Ω	90	100	110	
Differential data output swing	V <sub>OUT</sub>	mVp-p	300		900	
<b>IIC communication</b>						
IIC Clock frequency	-	KHZ	100		400	

## 6. Module Memory Map

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 I2C interface at address A0h and A2h. The memory is mapped in Figure 1.

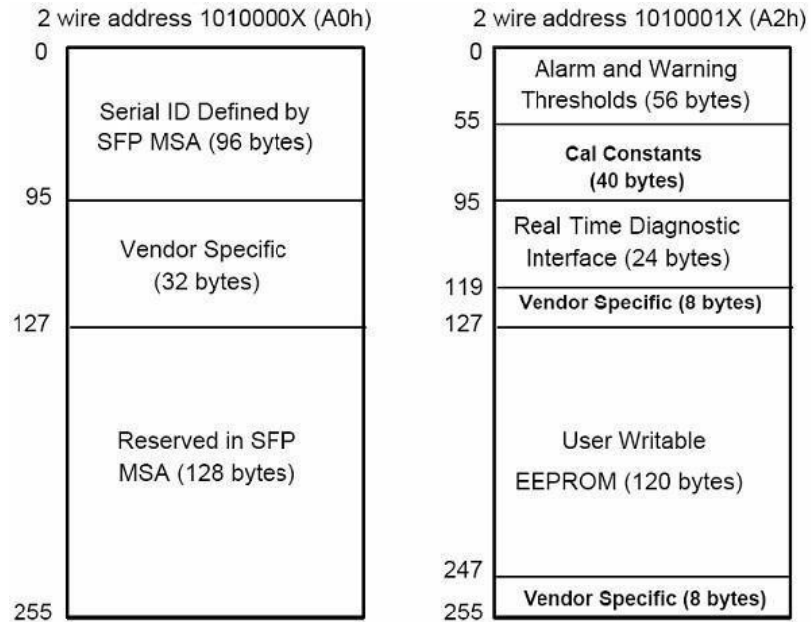


Figure 1 Digital Diagnostic Memory Map

## 7. Pin Assignment and Pin Description

### 7.1 Pin Assignment

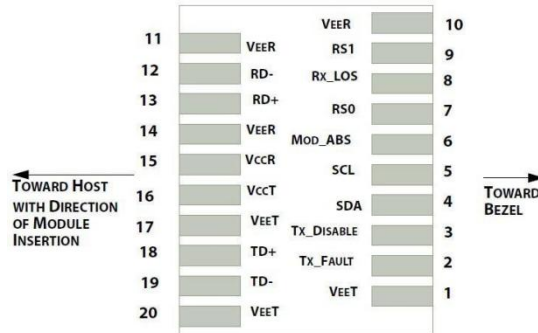


Figure 2 Electrical Pin-out Details

### 7.2 Pin Description

Table 7.1 Pin Description

PIN #	Name	Function	Notes
1	VeeT	Module transmitter ground	1
2	Tx Fault	Module transmitter fault	2
3	Tx Disable	Transmitter Disable; Turns off transmitter laser output	3
4	SDL	2 wire serial interface data input/output (SDA)	4
5	SCL	2 wire serial interface clock input (SCL)	4
6	MOD-ABS	Module Absent, connect to VeeR or VeeT in the module	2
7	RS0	Rate select0: module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module	
8	LOS	Receiver Loss of Signal Indication	
9	RS1	Rate select1: module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.	
10	VeeR	Module receiver ground	1
11	VeeR	Module receiver ground	1
12	RD-	Receiver inverted data out put	
13	RD+	Receiver non-inverted data out put	
14	VeeR	Module receiver ground	1
15	VccR	Module receiver 3.3V supply	
16	VccT	Module transmitter 3.3V supply	
17	VeeT	Module transmitter ground	1
18	TD+	Transmitter non-inverted data out put	
19	TD-	Transmitter inverted data out put	
20	VeeT	Module transmitter ground	1

**Notes:**

1. The module ground pins shall be isolated from the module case.
2. This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10Kohms to Host\_Vcc on the host board.
3. This pin shall be pulled up with 4.7K-10Kohms to VccT in the module.
4. This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10Kohms to Host\_Vcc on the host board.

### 8. Typical Application Circuit

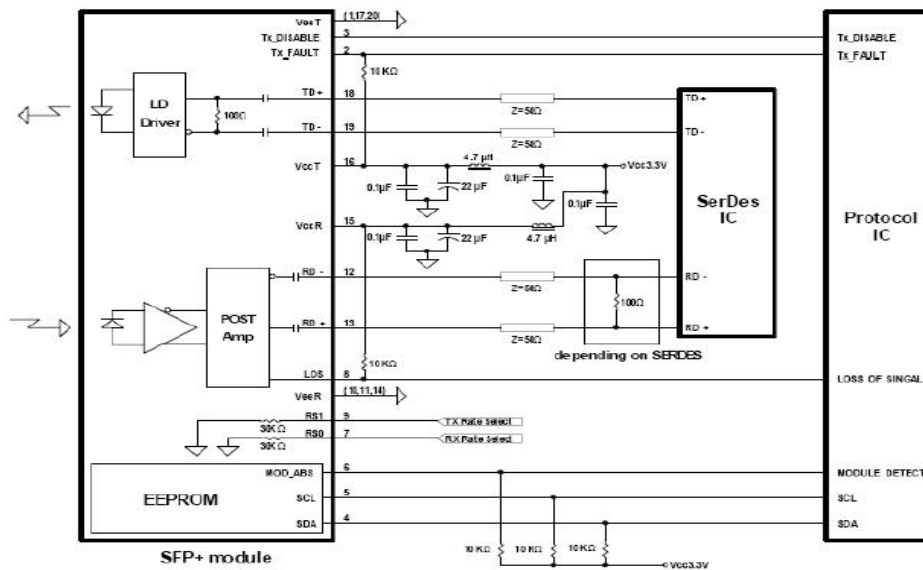


Figure 3 Typical application circuit

### 9. Package Dimensions

Figure 4 shows the package dimensions of the module. The module is designed to be compliant with SFP MSA specification.

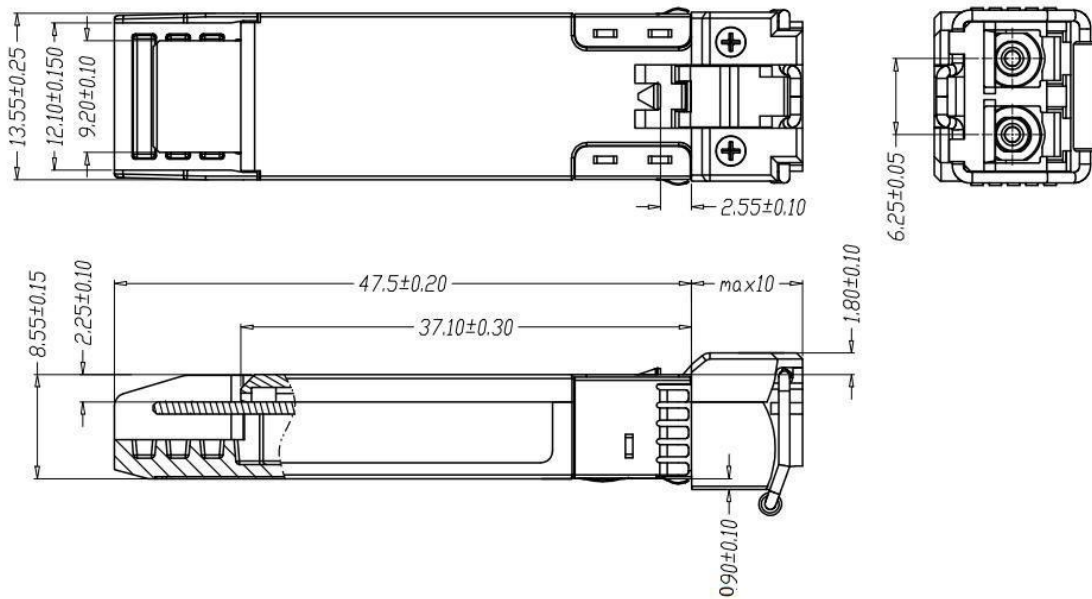


Figure 4 Package Dimensions

## 10. For More Information

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