ESP853X-01D

32G FC SFP28 SR 100m Transceiver

PRODUCT FEATURES

- Support 28.05Gb/s bit rate
- Compliant to SFP+ Electrical MSA
- 850nm VCSEL laser and PIN Photo-detector
- Transmission distance up to 100m (OM4)
- +3.3V single power supply
- Low power consumption
- Operating case temperature
  Commercial: 0°C to +70 °C
- RoHS compliant

APPLICATIONS

- 32G Fiber channel
- Other optical links

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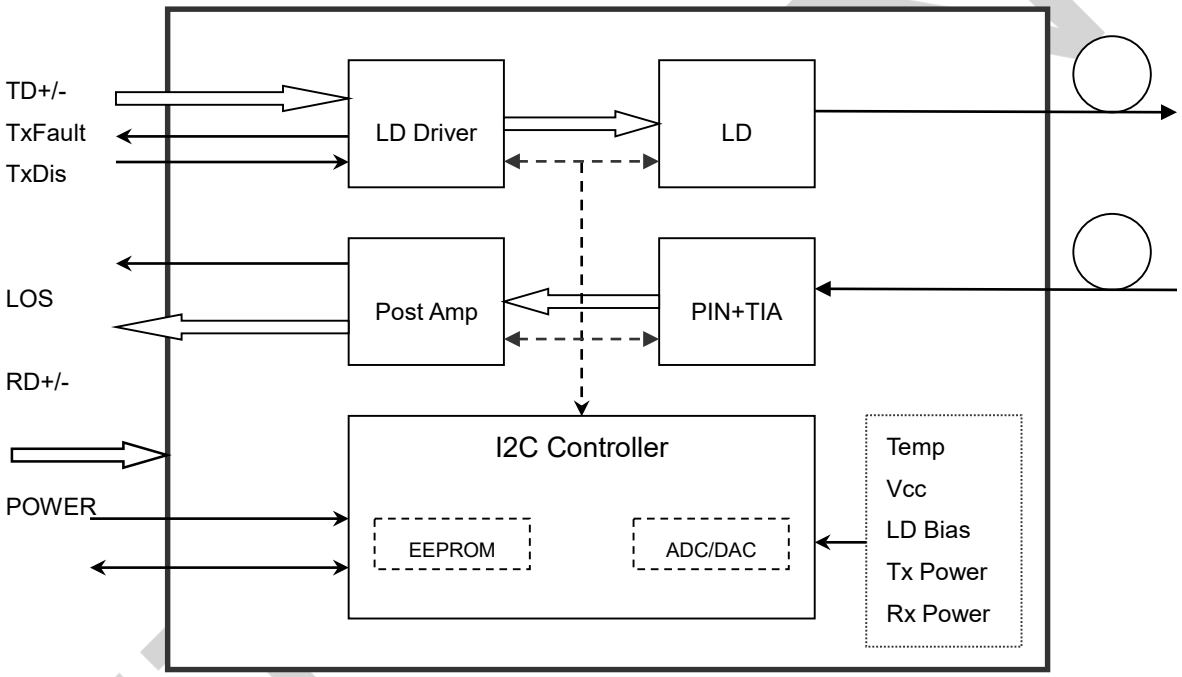
DESCRIPTIONS

This product is a 32G FC SFP28 transceiver designed for optical communication compliant with 32G FC standard. Its high performance VCSEL transmitter and high sensitivity PIN receiver provide superior performance for 32G FC application up to 100m (with FEC) Links.

The product is designed with SFP28 form factor, which is the optical/electrical connection according to the SFP+ Multi-Source Agreement (MSA).

Module Block Diagram



Ordering Information

Part No.	Data Rate(optical)	Laser	Fiber Type	Distance	Optical Interface	Temp	DDMI	Latch Color
ESP853X-01D	28.05Gb/s	VCSEL	MMF	100m	FC	0~70℃	Y	Black

Absolute Maximum Ratings

It has to be noted that the operation in excess of any individual absolute maximum ratings might cause permanent damage to this module.

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Supply Voltage	Vcc_3	-0.5	-	+3.6	V	
Storage Temperature	T_s	-40	-	+85	°C	
Operating Humidity	RH	+5	-	+85	%	1
Receiver Damage Threshold per Lane	P_{IND}	+3.4	-	-	dBm	

Note: 1 No condensation

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	T_C	0	-	70	°C	
Power Supply Voltage	Vcc	3.14	3.3	3.47	V	
Power Dissipation	Pd	-	-	1.8	W	
Bit Rate	BR	-	-	28.05	Gbps	

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units	Notes
Input Logic Level High	V_{IH}	2.0	-	V_{CC}+0.3	V	
Input Logic Level Low	V_{IL}	V_{EE}-0.3	-	0.8	V	
Output Logic Level High	V_{OH}	2.0	-	V_{CC}+0.3	V	
Output Logic Level Low	V_{OL}	0	-	0.4	V	
Transmitter						
Differential Data Input Swing	$V_{in,P-P}$	200	-	1000	mV_{PP}	
Input Differential Impedance	Z_{IN}	90	100	110	Ω	
Receiver						
Differential Date Output Swing	V_{out}	200	-	1000	mV	
Output Differential Impedance	Z_D	90	100	110	Ω	

Optical and Characteristics

Parameter	Symbol	Unit	Min	Typ.	Max	Notes
Optical transmitter Characteristics						
Bit Rate	BR	Gbps		28.05	-	
Center Wavelength Range	λc	nm	840	850	860	
RMS Spectral Width	Δλ	nm	-	-	0.6	
Average Launch power Tx_off	Poff	dBm	-	-	-30	

Launch Optical Power	P_0	dBm	-6.2		2	1
Extinction Ratio	ER	dB	2	-	-	
Optical Receiver Characteristics						
Bit Rate	BR	Gbps		-	28.05	
Sensitivity	BER	dBm	-	-	-10.2	
Overload Input Optical Power	P_{IN}	dBm	2	-	-	
Center Wavelength Range	λc	nm	840	-	860	
LOS Assert	-	dBm	-30	-	-	
LOS De-Assert	-	dBm	-	-	-16	
LOS Hysteresis	-	dB	0.5	-	-	

Note:

1.Coupled into 50/125 MMF.

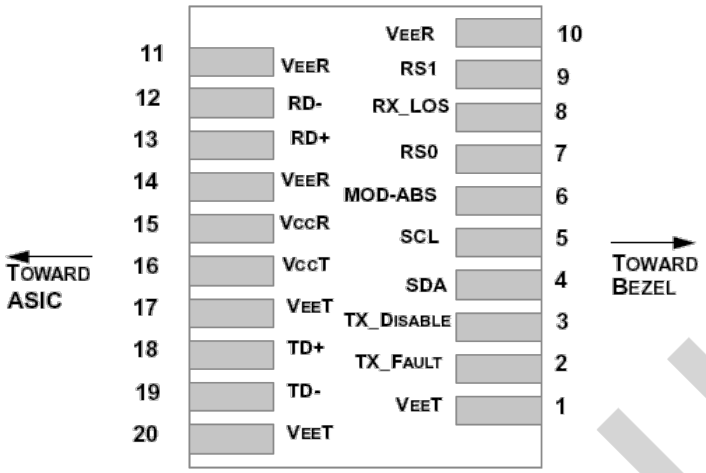
Digital Diagnostics

Parameter	Range	Accuracy	Unit	Calibration
Temperature	0 to +70	±3°C	°C	Internal
Voltage	3.0 to 3.6	±3%	V	Internal
Bias Current	0 to 15	±10%	mA	Internal
TX Power	-6.2 to 2	±3dB	dBm	Internal
RX Power	-10.2 to 2	±3dB	dBm	Internal

Communication Interface Timing Characteristics

Parameter	Symbol	Min	Typical	Max	Unit
Tx Disable Negate Time	t_on			2	ms
Tx Disable Assert Time	t_off			100	μs
Time To Initialize, including Reset of Tx Fault	t_init			300	ms
Tx Fault Assert Time	t_fault			100	μs
Tx Disable To Reset	t_reset	10			μs
LOS Assert Time	t_loss_on			100	μs
LOS De-assert Time	t_loss_off			100	μs
Serial ID Clock Rate	f_serial_clock		100	400	KHz
MOD_DEF (0:2)-High	VH	2		Vcc	V
MOD_DEF (0:2)-Low	VL			0.8	V

Pin Diagram



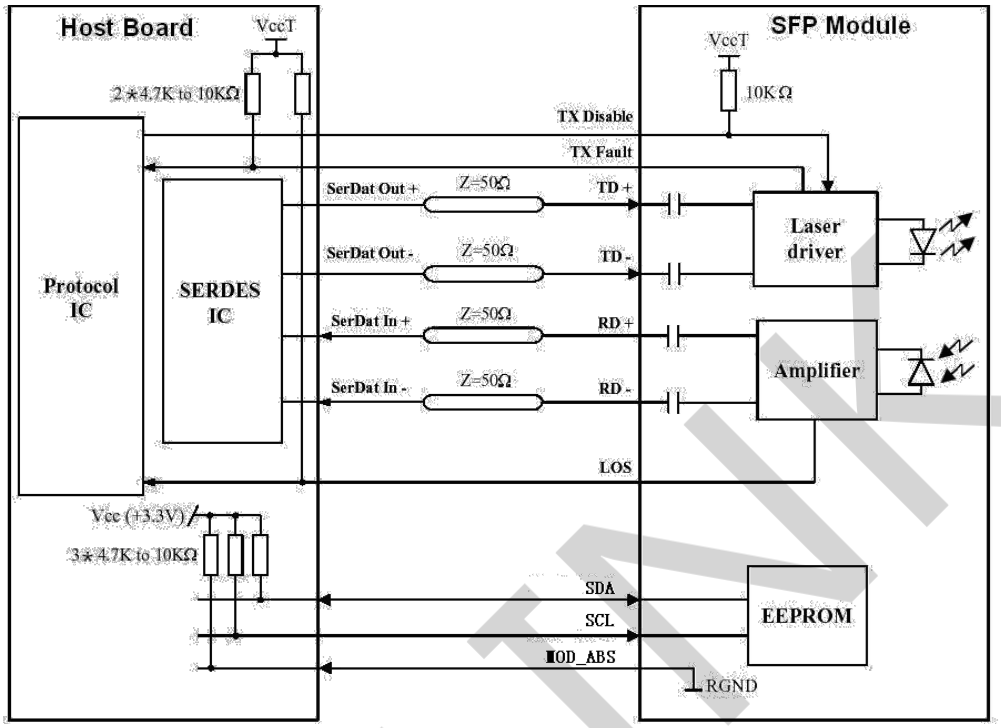
Pin Definitions

Pin	Symbol	Name/Description	Notes
1	$V_{EE}T$	Module Transmitter Ground	1
2	TX_FAULT	Module Transmitter Fault	2
3	TX_DISABLE	Transmitter Disable; Turns off transmitter laser output	3
4	SDA	2-Wire Serial Interface Data Line (MOD-DEF2)	2
5	SCL	2-Wire Serial Interface Clock (MOD-DEF1)	2
6	MOD_ABS	Module Absent, connected to $V_{EE}T$ or $V_{EE}R$ in the module	
7	RS0	Rate Select 0, optionally controls SFP+ module receiver	
8	RX_LOS	Receiver Loss of Signal Indication (In FC designated as Rx_LOS and in Ethernet designated as NOT Signal Detect)	2
9	RS1	Rate Select 1, optionally controls SFP+ module transmitter	
10	$V_{EE}R$	Module Receiver Ground	1
11	$V_{EE}R$	Module Receiver Ground	1
12	RD-	Receiver Inverted Data Output	
13	RD+	Receiver Non-Inverted Data Output	
14	$V_{EE}R$	Module Receiver Ground	1
15	$V_{CC}R$	Module Receiver 3.3 V Supply	
16	$V_{CC}T$	Module Transmitter 3.3 V Supply	
17	$V_{EE}T$	Module Transmitter Ground	1
18	TD+	Transmitter Non-Inverted Data Input	
19	TD-	Transmitter Inverted Data Input	
20	$V_{EE}T$	Module Transmitter Ground	1

Note:

1. Circuit ground is internally isolated from chassis ground.
2. The pins shall be pulled up with 4.7K-10Kohms to a voltage between 3.14V and 3.46V on host board.
3. The pin is pulled up to VCCT with a 4.7K-10KΩ resistor in the module.

Recommended Interface Circuit



Mechanical Diagram

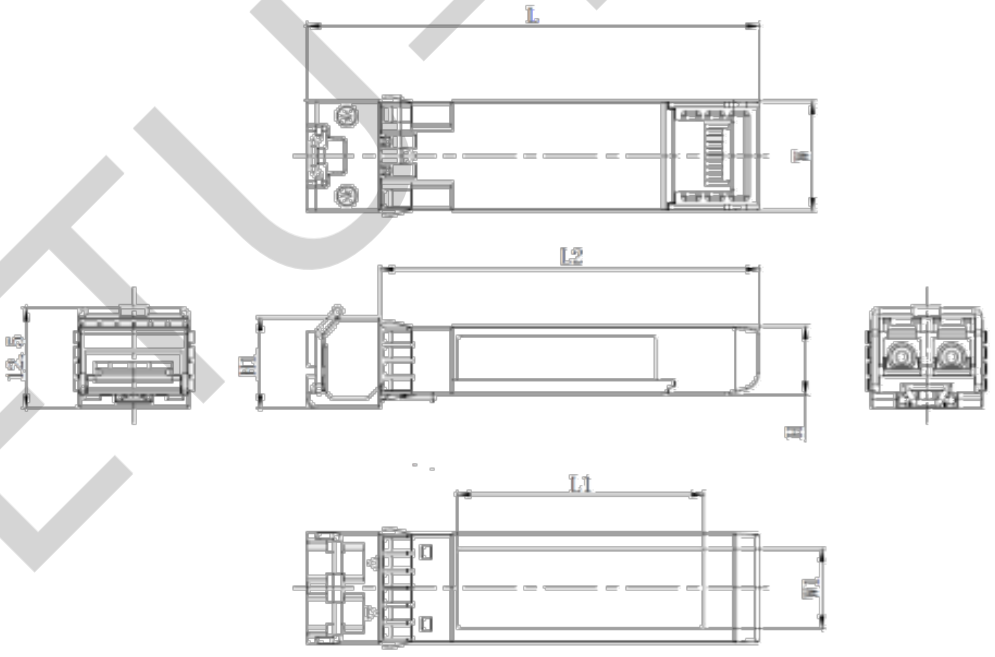


Figure 2, Mechanical Diagram

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Revision History

Version No.	Date	Description
1.0	May 24, 2019	Preliminary datasheet
2.0	September 30,2023	Product upgrades

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