

ESP313X-40D

32Gb/s SFP28 1310nm 40km Fiber Channel Transceiver Module

PRODUCT FEATURES

- Up to 28.05Gb/s data links
- 1310nm DFB laser and APD receiver
- Up to 40km on 9/125um SMF
- Hot-pluggable SFP footprint
- Digital diagnostic capabilities
- Class 1 laser safety certified
- Cost effective SFP28 solution, enables higher port densities and greater bandwidth
- RoHS compliant and lead-free
- Single +3.3V power supply
- All-metal housing for superior EMI performance
- Case operating temperature
- Temperature Range:
Commercial: 0 ~ +70°C



APPLICATIONS

- 32GFC Fibre channel

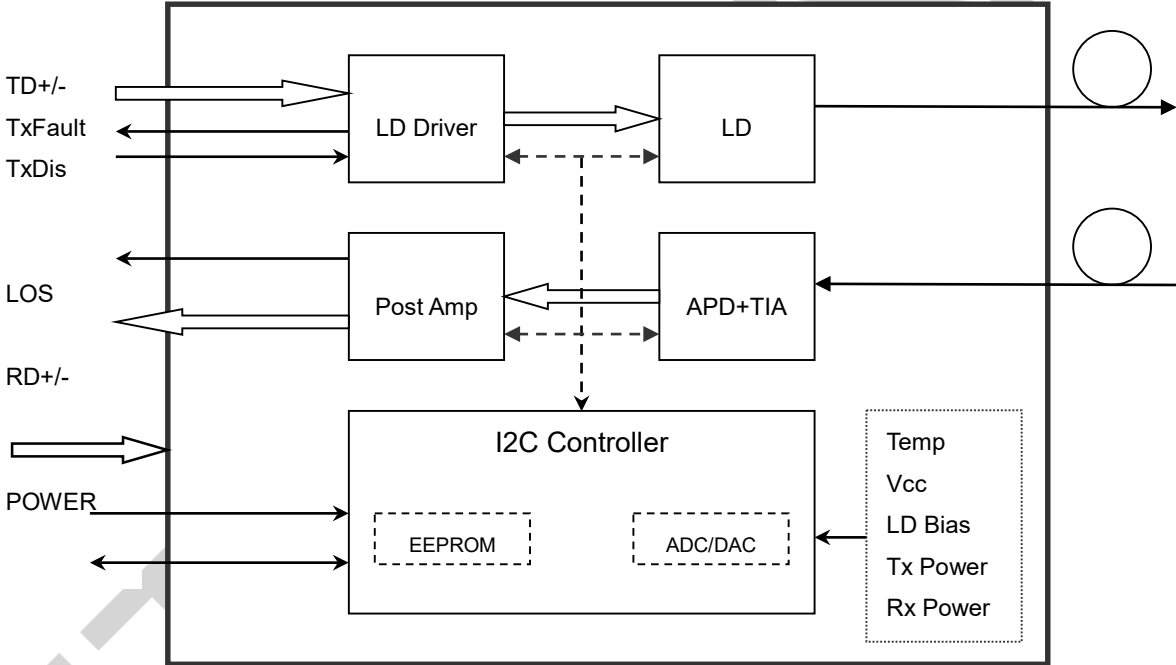
DESCRIPTIONS

The SFP28 transceivers are high performance, cost effective modules supporting data rate of 28.05Gbps and 40km transmission distance with SMF.

The transceiver consists of three sections: a DFB laser transmitter, a APD photodiode integrated with a trans-impedance preamplifier (TIA) and MCU control unit. All modules satisfy class I laser safety requirements.

The transceivers are compatible with SFP Multi-Source Agreement and SFF-8472 digital diagnostics functions.

Module Block Diagram



Ordering Information

Part No.	Data Rate(optical)	Laser	Fiber Type	Distance	Optical Interface	Temp	DDMI
ESP313X-40D	28.05Gb/s	DFB	SMF	40km	LC	0°C~+70°C	Y

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	Max	Unit	Notes
Storage Temperature	TS	-40	85	°C	
Power Supply Voltage	VCC	-0.5	3.6	V	
Relative Humidity (non-condensation)	RH	5	95	%	
Damage Threshold	THd	-3		dBm	

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	TOP	0		70	°C	
Power Supply Voltage	VCC	3.135	3.3	3.465	V	
Data Rate			28.05		Gb/s	
Control Input Voltage High		2		Vcc	V	
Control Input Voltage Low		0		0.8	V	
Link Distance (SMF)	D			40	km	9/125um

Electrical Characteristics

The following electrical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Power Consumption	p			1.8	W	
Supply Current	I _{cc}			520	mA	
Transmitter						
Single-ended Input Voltage Tolerance	V _{cc}	-0.3		4.0	V	
Common mode voltage tolerance		15			mV	
Differential Input Voltage Swing	V _{in,pp}	180		700	mVpp	
Differential Input Impedance	Z _{in}	90	100	110	Ohm	1
Transmit Disable Assert Time				10	us	
Transmit Disable Voltage	V _{dis}	V _{cc} -1.3		V _{cc}	V	
Transmit Enable Voltage	V _{en}	V _{ee}		V _{ee} +0.8	V	2
Receiver						
Single-ended Input Voltage Tolerance	V _{cc}	-0.3		4.0	V	
Differential Output Voltage Swing	V _{out,pp}	300		900	mVpp	
Differential Output Impedance	Z _{out}	90	100	110	Ohm	3

Data output rise/fall time	Tr/Tf	9.5			ps	4
LOS Assert Voltage	VlosH	Vcc-1.3		Vcc	V	5
LOS De-assert Voltage	VlosL	Vee		Vee +0.8	V	5

Notes:

1. Connected directly to TX data input pins. AC coupled thereafter.
2. Or open circuit.
3. Input 100 ohms differential termination.
4. These are unfiltered 20-80% values.
5. Loss of Signal is LVTTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

Optical and Characteristics

The following optical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Transmitter						
Center Wavelength	λ_C	1295	1310	1325	nm	
Optical Spectral Width	$\Delta\lambda$			1	nm	
Average Optical Power	PAVG	-3		6	dBm	
Side Mode Suppression Ratio	SMSR	20			dB	
Optical Extinction Ratio	ER	4			dB	
Transmitter OFF Output Power	Poff			-30	dBm	
Transmitter and Dispersion Penalty	TDP			2.7	dB	
Optical Return Loss Tolerance	ORLT			20	dB	
Transmitter Eye Mask	Compliant with IEEE802.3ae					
Receiver						
Center Wavelength	λ_C	1295	1310	1325	nm	
Receiver Sensitivity (OMA)	Sen.			-14	dBm	
Stressed Receiver Sensitivity (OMA)				-11.5	dBm	
Average Receive Power		-14		-4	dBm	
Input Saturation Power (overload)	Psat	-8			dBm	
LOS Assert	LOSA	-30			dBm	
LOS De-assert	LOSD			-21	dBm	
Damage Threshold	THd	-3			dBm	
LOS Hysteresis	LOSH	0.5			dB	

Digital Diagnostics

The following digital diagnostic characteristics are defined over the Recommended Operating Environment unless otherwise specified. It is compliant to SFF-8472 Rev10.2 with internal calibration mode. For external calibration mode please contact our sales staff.

Parameter	Symbol	Min.	Max	Unit	Notes
Temperature monitor absolute error	DMI_Temp	-3	3	degC	Over operating temp
Supply voltage monitor absolute error	DMI_VCC	-0.15	0.15	V	Full operating range
RX power monitor absolute error	DMI_RX	-3	3	dB	
Bias current monitor	DMI_bias	-10%	10%	mA	
TX power monitor absolute error	DMI_TX	-3	3	dB	

Pin Diagram

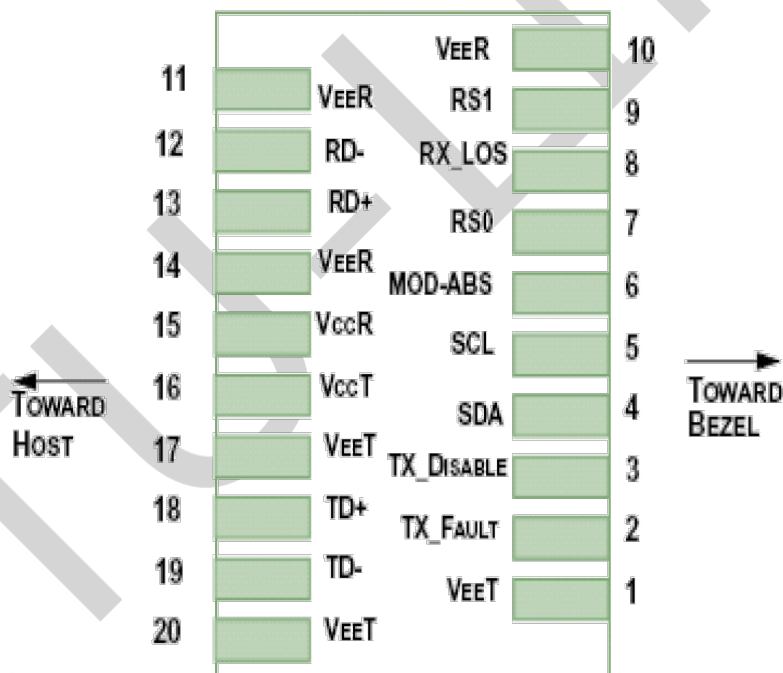


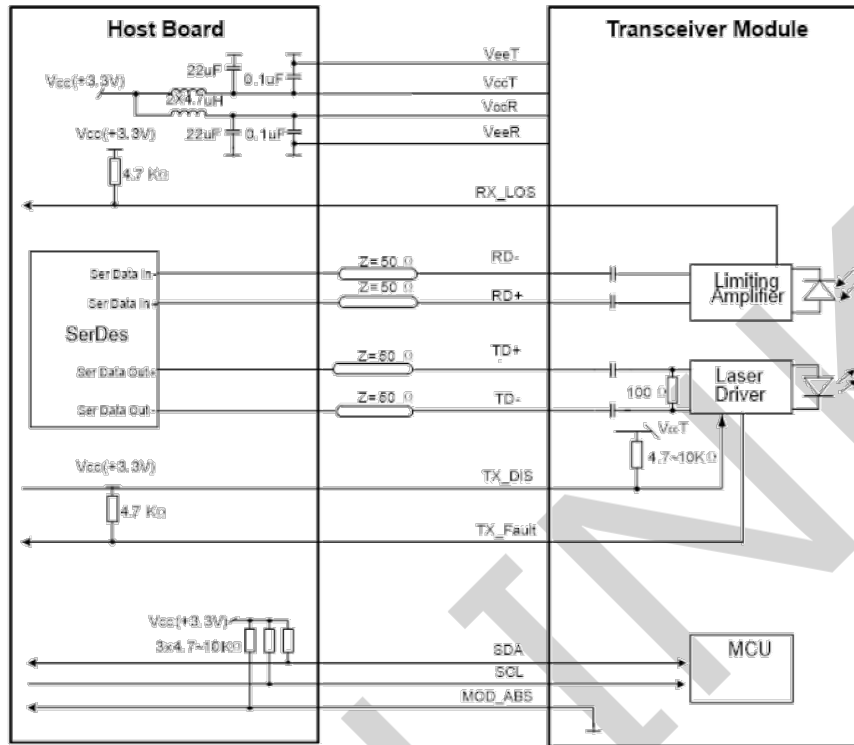
Figure1. Diagram of host board connector block pin numbers and names

Pin Definitions

PIN	Name	Name/Description	Notes
1	VeeT	Transmitter Ground	1
2	TX_Fault	Transmitter Fault	

3	TX_Disable	Transmitter Disable; Turns off transmitter laser output	
4	SDA	Two wire serial interface Data Line (LVCMOS-I/O) (MOD-DEF2)	2
5	SCL	Two wire serial interface Clock Line (LVCMOS-I/O) (MOD-DEF1)	2
6	MOD_ABS	Module Definition, Grounded in the module	
7	RS0	Rx Rate Select:	
8	RX_LOS	Receiver Loss of Signal Indication Active LOW	
9	RS1	Transmitter Rate Select (not used)	
10	VeeR	Receiver Ground	1
11	VeeR	Receiver Ground	1
12	RD-	Receiver Inverted Data Output	
13	RD+	Receiver Data Output	
14	VeeR	Receiver Ground	1
15	VccR	Receiver Power - +3.3V	
16	VccT	Transmitter Power - +3.3 V	
17	VeeT	Transmitter Ground	1
18	TD+	Transmitter Non-Inverted Data Input	
19	TD-	Transmitter Inverted Data Input	
20	VeeT	Transmitter Ground	1

Recommended Interface Circuit



Mechanical Diagram

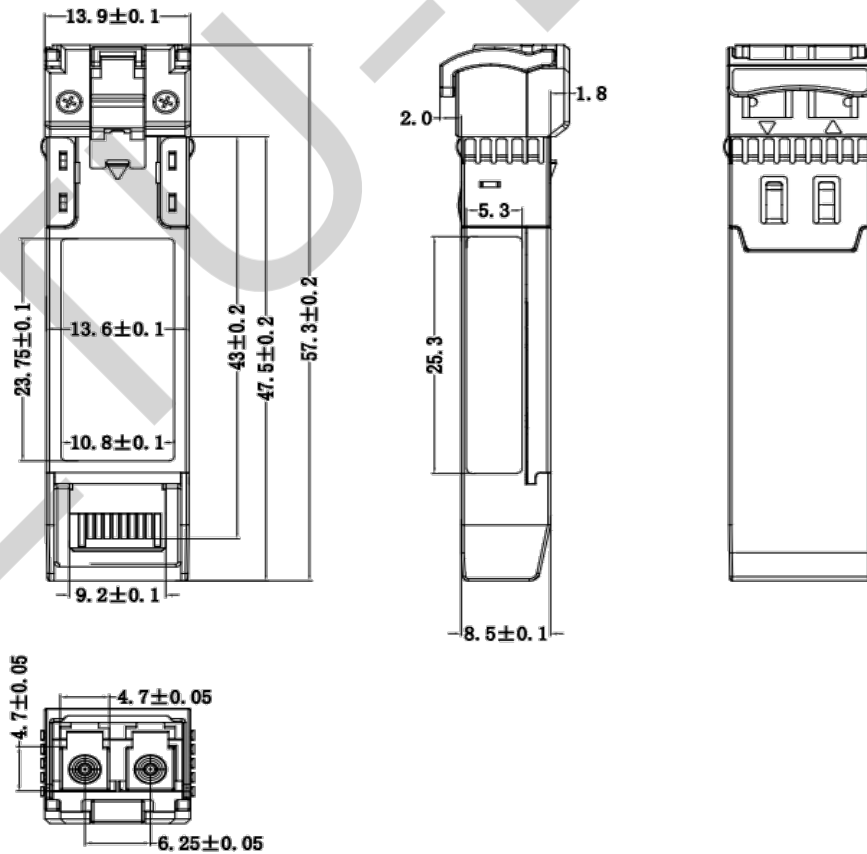


Figure2. Mechanical Outlin

Revision History

Version No.	Date	Description
1.0	May 19, 2022	Preliminary datasheet
2.0	September 28,2023	Product upgrades

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