EQP85Y-01D-3

100Gb/s QSFP28 SR4 Transceiver

PRODUCT FEATURES

- Hot Pluggable QSFP28 form factor
- MPO connector receptacle
- Four-channel full-duplex transceiver modules
- Transmission data rate up to 25.78Gb/s per channel
- Up to 70 m on OM3 Multimode Fiber(MMF) and 100 m on OM4 MMF
- Low power consumption < 2.2 W
- Operating case temperature 0 C to 70 C
- 3.3 V power supply voltage
- RoHS 6 compliant
- Built-in digital diagnostic function

APPLICATIONS

- IEEE 802.3bm 100G BASE SR4
- Proprietary High Speed Interconnections
- Data center

STADNDARDS

- QSFP MSA
- SFF-8436 QSFP+
- SFF-8665
- SFF-8636
- Ethernet 100GBASE-SR4

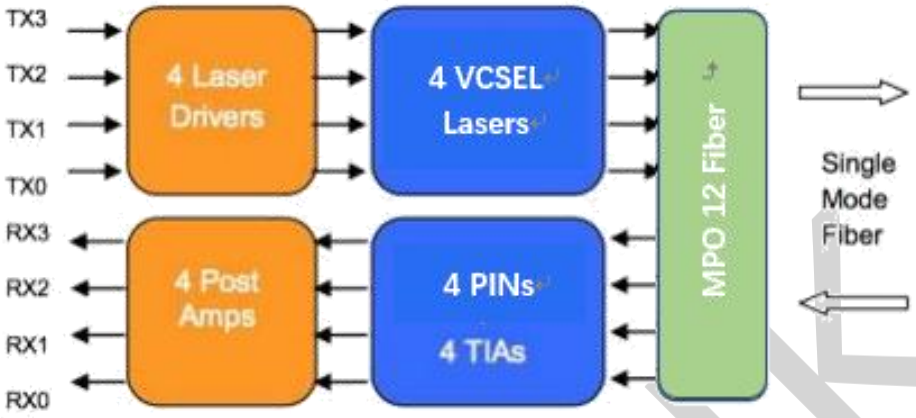
DESCRIPTIONS

ETU-LINK EQP85Y-01D-3 are designed for use in 100 Gigabit per second links over multimode fiber. They are compliant with the QSFP28 MSA and IEEE 802.3bm

The optical transmitter portion of the transceiver incorporates a 4-channel VCSEL (Vertical Cavity Surface Emitting Laser) array, a 4-channel input buffer and laser driver, diagnostic monitors, control and bias blocks. For module control, the control interface incorporates a Two Wire Serial interface of clock and data signals. Diagnostic monitors for VCSEL bias, module temperature, transmitted optical power，received optical power and supply voltage are implemented and results are available through the TWS interface. Alarm and warning thresholds are established for the monitored attributes. Flags are set and interrupts generated when the attributes are outside the thresholds. Flags are also set and interrupts generated for loss of input signal (LOS) and transmitter fault conditions. All flags are latched and will remain set even if the condition initiating the latch clears and operation resumes. All interrupts can be masked and flags are reset by reading the appropriate flag register. The optical output will squelch for loss of input signal unless squelch is disabled. Fault detection or channel deactivation through the TWS interface will disable the channel. Status, alarm/warning and fault information are available via the TWS interface.

The optical receiver portion of the transceiver incorporates a 4-channel PIN photodiode array, a 4-channel TIA array, a 4 channel output buffer, diagnostic monitors, and control and bias blocks. Diagnostic monitors for optical input power are implemented and results are available through the TWS interface. Alarm and warning thresholds are established for the monitored attributes. Flags are set and interrupts generated when the attributes are outside the thresholds. Flags are also set and interrupts generated for loss of optical input signal (LOS). All flags are latched and will remain set even if the condition initiating the flag clears and operation resumes. All interrupts can be masked and flags are reset upon reading the appropriate flag register. The electrical output will squelch for loss of input signal (unless squelch is disabled) and channel de-activation through TWS interface. Status and alarm/warning information are available via the TWS interface.

Module Block Diagram



Ordering Information

Part No.	Data Rate(optical)	Laser	Fiber Type	Distance	Optical Interface	Temp	DDMI
EQP85Y-01D-3	103.125	VCSEL	MMF	100M	MPO	0~70℃	YES

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Supply Voltage	Vcc	0	3.6	V	
Storage Temperature	Ts	-40	85	°C	
Relative Humidity	RH	5	85	%	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Case Temperature	Tc	0		70	°C	Commercial
Power Supply Voltage	Vcc	3.13	3.3	3.47	V	
Power Supply Current	Icc			0.65	A	

Optical and Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Data Rate	DR		25.78125		Gb/s	
Center Wavelength	λ_C	840	850	860	nm	
RMS Spectral Width	λ_{RMS}			0.6	nm	

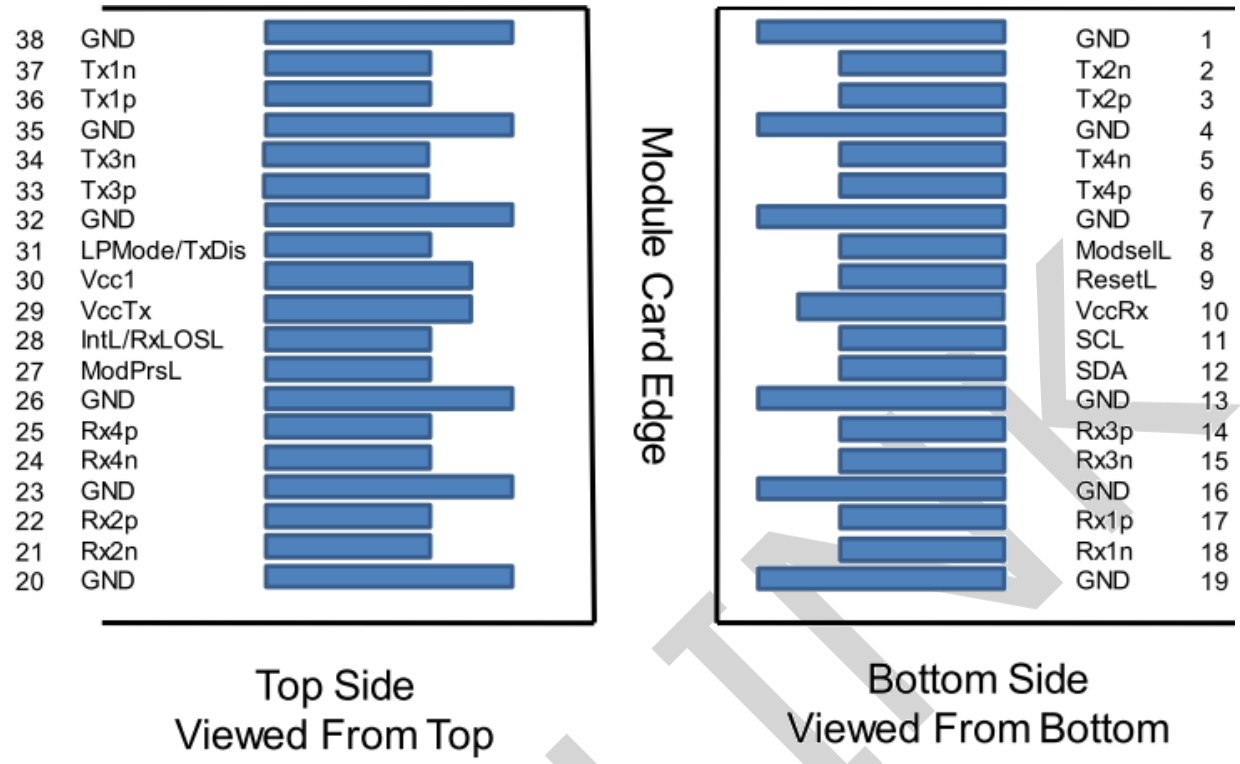
Average Launch Power each lane	Pavg	-8.4		+2.4	dBm	
Optical Modulation Amplitude (OMA) each lane	P_{OMA}	-6.4		3	dBm	
Difference in Launch Power between any two lanes	$P_{tx,diff}$			4	dB	
Extinction Ratio	ER	3			dB	
Average Launch Power off each lane	Poff			-30	dBm	
Transmitter Eye Mask margin {X1, X2, X3, Y1, Y2, Y3}		> 20% margin {0.3, 0.38, 0.45, 0.35, 0.41, 0.5}				Hit Ratio = 5x10-5
Input Differential Impedance	Z_{IN}		100		Ω	
Data Input Swing Differential	V_{INPP}	300		1000	mV	
Receiver						
Data rate per Lane	BR		25.78125		Gb/s	
DamageThreshold	THd	3			dBm	
Average receiver power, each lane	-	-10.3		2.4	dBm	
Receiver Sensitivity in OMA, each Lane	SEN			-9	dBm	1
LOS De-Assert	LOSD			-10	dBm	
LOS Assert	LOSA	-30			dBm	
LOS Hysteresis	LOSH	0.5		6	dB	
Data Output Swing Differential	V_{OUTPP}	500		800	mV	
LOS Fault	-	2.0		Vcc	V	
LOS Normal	-	0		0.8	V	

Note: 1. Measured with a PRBS 2^31-1 test pattern, @25.78125 Gb/s, BER@5E-5

Digital Diagnostics

Parameter	Symbol	Accuracy	Calibration	Note
Temperature	DMI_Temp	±3 °C	Internal	Over operating temp
Voltage	DMI _VCC	±0.1 V	Internal	Full operating range
Bias Current	DMI_BIAS	±10%	Internal	Per channel
TX Power	DMI_TX	±3 dB	Internal	Per channel
RX Power	DMI_RX	±3 dB	Internal	Per channel

Pin Diagram



Pin Definitions

Pin	Logic	Symbol	Description	Note
1		GND	Ground	
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-Inverted Data Output	
4		GND	Ground	
5	CML-I	Tx4n	Transmitter Inverted Data Input	
6	CML-I	Tx4p	Transmitter Non-Inverted Data Output	
7		GND	Ground	
8	LVTLL-I	ModSelL	Module Select	
9	LVTLL-I	ResetL	Module Reset	
10		VccRx	+3.3 V Power Supply Receiver	
11	LVCMOS-I/O	SCL	2-Wire Serial Interface Clock	
12	LVCMOS-I/O	SDA	2-Wire Serial Interface Data	
13		GND	Ground	
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	
15	CML-O	Rx3n	Receiver Inverted Data Output	
16		GND	Ground	
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	
18	CML-O	Rx1n	Receiver Inverted Data Output	

19		GND	Ground	
20		GND	Ground	
21	CML-O	Rx2n	Receiver Inverted Data Output	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	
23		GND	Ground	
24	CML-O	Rx4n	Receiver Inverted Data Output	
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	
26		GND	Ground	
27	LVTTL-O	ModPrsL	Module Present	
28	LVTTL-O	IntL	Interrupt Output	
29		VccTx	+3.3 V Power Supply transmitter	
30		Vcc1	+3.3 V Power Supply	
31	LVTTL-I	LPMode	Low Power Mode	
32		GND	Ground	
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	
34	CML-I	Tx3n	Transmitter Inverted Data Output	
35		GND	Ground	
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	
37	CML-I	Tx1n	Transmitter Inverted Data Output	
38		GND	Ground	

Recommended Interface Circuit

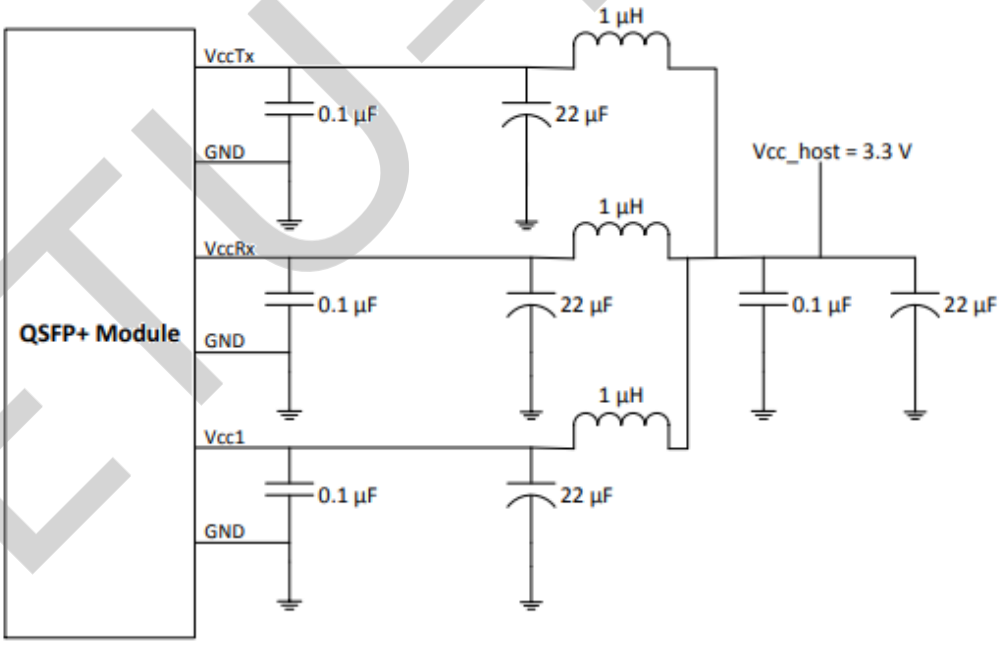
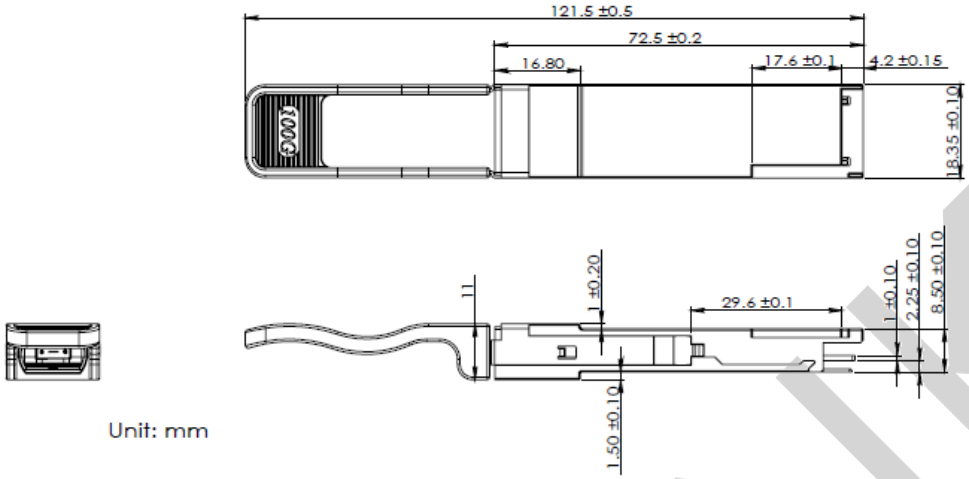


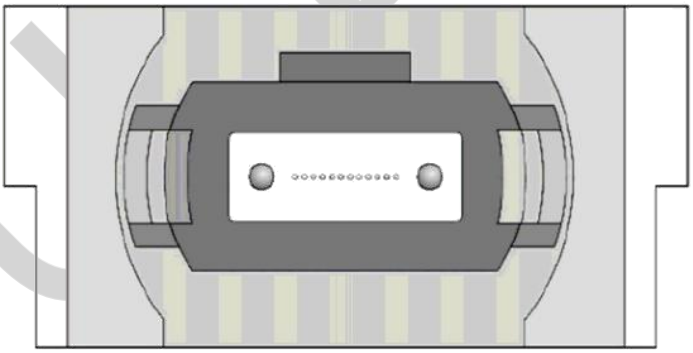
FIGURE 5-4 RECOMMENDED HOST BOARD POWER SUPPLY FILTERING

Mechanical Diagram



Optical Interface Lanes and Assignment

The optical interface port is a male MPO connector. The four fiber positions on the left as shown in Figure 2, with the key up, are used for the optical transmit signals (Channel 1 through4). The fiber positions on the right are used for the optical receive signals (Channel 4 through 1). The central four fibers are physically present.



Transmit Channels: 1 2 3 4
Unused positions: x x x x
Receive Channels: 4 3 2 1

Revision History

Version No.	Date	Description
1.0	February 18, 2020	Preliminary datasheet
1.1	July 26, 2024	Format change

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