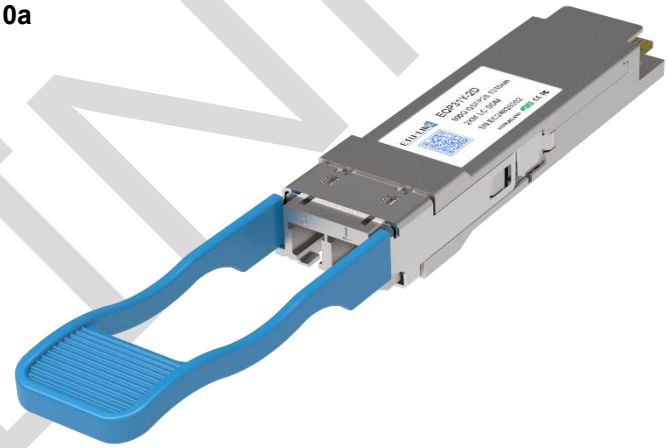
EQP31Y-2D

100Gbps QSFP28 FR1 2km Single Lambda Transceiver

PRODUCT FEATURES



- Compliant with QSFP28 Standard: SFF-8636 Rev 2.10a
- Compliant with IEEE802.3cu D3.2 100GBASE- FR1
- High speed I/O electrical interface (CAUI-4)
- Single 3.3V Supply Voltage
- Maximum power consumption 4W
- 0-70 ºC Case Operating Temperature
- 1311nm EML laser and PIN Receiver
- Hermetically sealed TO Based design
- QSFP28 MSA package with duplex LC connector
- Two Wire Serial Interface with Digital Diagnostic Monitoring
- KP1 FEC termination inside module
- Supporting 2km reach of single mode fiber
- Complies with EU Directive 2011/65/EU (RoHS compliant)
- Class 1 Laser

APPLICATIONS

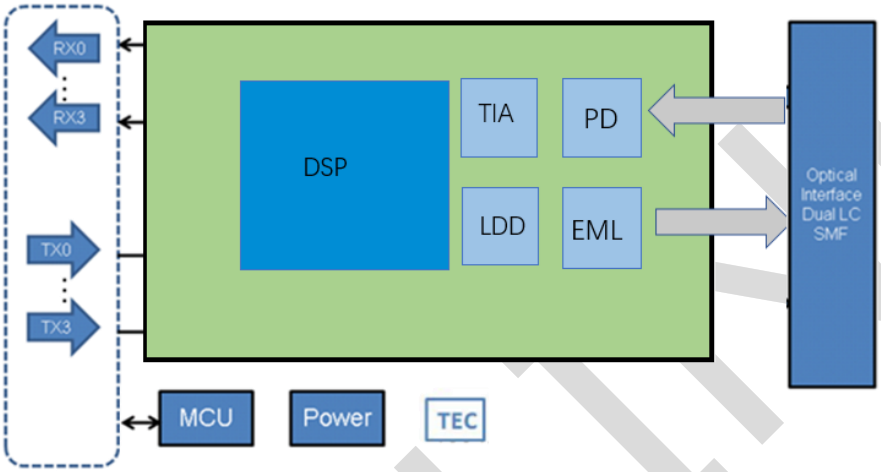
- Data Center
- 100 Gigabit Ethernet

ETU-LINK

DESCRIPTIONS

ETU's EQP31Y-02D is a transceiver module designed for 2 km optical communication applications, It can convert 4-channel 25.78125 Gbit/s electrical data to 1-channel 106.25 Gbit/s optical signals.And convert 1 channel 106.25 Gbit/s optical signals to 4-channel output electrical data on the receiver side. t is intended for the service with single mode fiber in 100Gb/s high speed data communications. The optical signals are multiplexed to a single-mode fiber through commercial standard LC connector.

Module Block Diagram



Ordering Information

Part No.	Data Rate(Gbps)	Laser	Fiber Type	Distance	Optical Interface	Temp	DDMI	Latch Color
EQP31Y-2D	106.25	EML	SMF	2KM	LC	0~70℃	YES	Blue

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit
Storage Temperature	T_S	-40	-	+85	°C
Supply Voltage	V_{CC}	-0.5	-	+4.0	V
Operating Relative Humidity	RH	-	-	+85	%

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	T_C	0	-	+70	°C	
Power Supply Voltage	V_{CC}	3.13	3.3	3.47	V	
Transmission Distance	TD	-	-	2	km	Over SMF
Supply Current	Icc			1.06	A	

Electrical Characteristics

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

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter (Module Input)						
Input Differential Impedance	Rin	-	100	-	Ohm	
Differential Data Input Amplitude	$V_{IN,P-P}$		-	900	mVpp	
Differential termination mismatch (max)	D-mismatch	-	-	10	%	
DC common-mode input voltage		-0.3	-	2.8	V	
Transition time(20%~80%)	Tr Tf	10	-	-	ps	
LPMode, Reset and ModSelL / Tx dis	V_{IL}	-0.3	-	0.8	V	
LPMode, Reset and ModSelL / Tx dis	V_{IH}	2.0	-	V_{CC}+0.3	V	
Receiver (Module Output)						
Output Differential Impedance	Rout	-	100	-	Ohm	
Differential Data Output Amplitude	V_{OUTP-P}	-	-	900	mVpp	
Differential termination mismatch (max)	D-mismatch	-	-	10	%	
Transition time, 20% to 80%	Tr Tf	12	-		ps	
ModPrsL and IntL/ Rx los	V_{OL}	0	-	0.4	V	
ModPrsL and IntL/ Rx los	V_{OH}	V_{CC}-0.5	-	V_{CC}+0.3	V	

Optical and Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter						
Center Wavelength	λ_C	1304.5	1311	1317.5	nm	
Signaling Rate	SR			53.125	GBd	
Frequency Offset	Foffset	-100		100	ppm	
Average Launch Power	PTX	-2.4	-	4	dBm	1
Outer Optical Modulation Amplitude	OMA	-0.2	-	4.2	dBm	1
Transmitter and dispersion eye closure for PAM4 (TDECQ) (max)	TDECQ	-	-	3.4	dBm	
Average Output Power (Laser Turn off)	Poff	-	-	-30	dBm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Extinction Ratio	ER	3.5	-	-	dB	
RIN_OMA	RIN	-	-	-136	dB/Hz	
Transmitter reflectance	Tref	-	-	-26	dB	
Optical Return Loss Tolerance	ORLT	-	-	17.1	dB	
Receiver						
Center Wavelength	CW		1311		nm	
Damage threshold	Pdamage	5.5	-	-	dBm	2

Average Rx Power	PRx	-6.4	-	4.5	dBm	3
Receive power _OMAouter	POMA	-	-	4.7	dBm	
Receiver sensitivity _OMAouter	SEN _OMA	-	-	-4.5 –5.9 + SECQ	dBm	4,7
Reflectance	Ref	-	-	-26	dB	
Los Assert	LosA	-26	-		dBm	
Los De-Assert	LosDA	-	-	-8	dBm	
Los Hysteresis	LosH	0.5	-	-	dB	
Stressed receiver sensitivity _OMAouter	SRS	-	-	-2.5	dBm	5
Conditions of stressed receiver sensitivity teste :						
Stressed eye closure for PAM4 (SECQ)				3.4	dB	6
SECQ-10*lgCeq				3.4	dB	6

Notes:

1. The optical power is launched into SMF.
2. The receiver shall be able to tolerate, without damage, continuous exposure to an optical input signal having this average power level. The receiver does not have to operate correctly at this input power.
3. Average receive power, each lane (min) is informative and not the principal indicator of signal strength.
4. Measured with conformance test signal at TP3 using the test pattern PRBS31Q or scrambled idle for stressed receiver sensitivity for the BER= 2.4x10-4.
5. Measured with conformance test signal at TP3 (see3.11) for the BER specified in IEEE Std 802.3cu
6. Ceq is a coefficient defined in IEEE Std 802.3-2022 clause 121.8.5.3 which accounts for reference equalizer noise enhancemen
7. Receiver sensitivity mask for FR with SECQ up to 3.4 dB Figure1

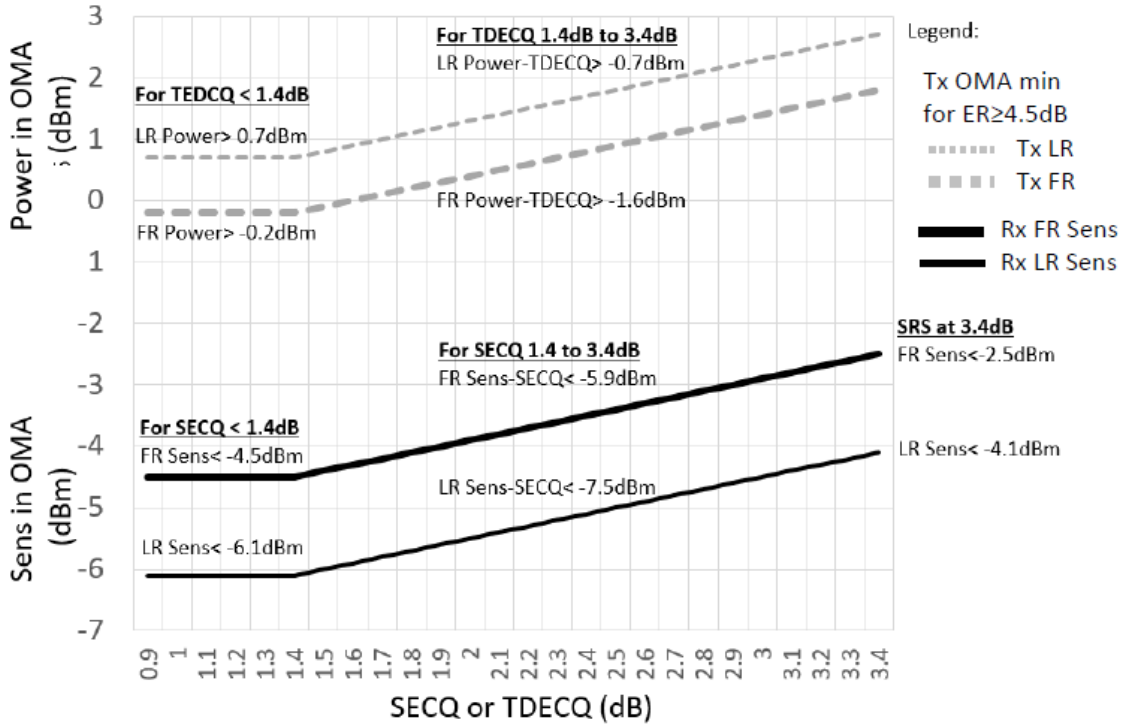


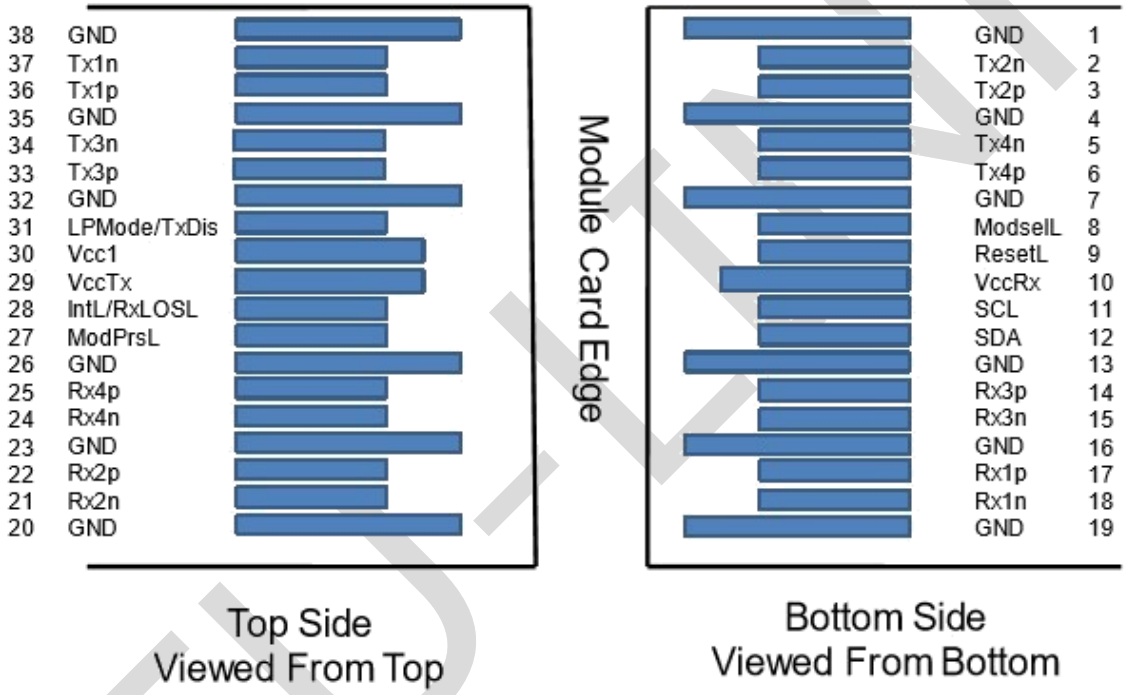
Figure 2-1: Illustration of receiver sensitivity mask for 100G-FR and LR with SECQ up to 3.4 dB

Figure1

Digital Diagnostics

Parameter	Range	Accuracy	Unit	Calibration
Temperature	0 to 70	±3	℃	commercial
Voltage	0 to VCC	±3%	V	commercial
Tx Bias Current	0 to 100	±10%	mA	commercial
Tx Output Power	-2.4 to +4	±3	dB	commercial
Rx Receive Power	-6.4 to +4.5	±3	dB	commercial

Pin Diagram



Recommended Host Board Power Supply Filtering

Pin Definitions

PIN	Logic	Symbol	Description	Plug Sequence	Notes
1		GND	Ground	1	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	3	
3	CML-I	Tx2p	Transmitter Non-Inverted Data Input	3	
4		GND	Ground	1	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	3	
6	CML-I	Tx4p	Transmitter Non-Inverted Data Input	3	
7		GND	Ground	1	1

8	LVTTL-I	ModselL	Module Select	3	
9	LVTTL-I	ResetL	Module Reset	3	
10		Vcc Rx	+3.3V Power Supply Receiver	2	2
11	LVCMOS-I/O	SCL	2-wire serial interface clock	3	
12	LVCMOS-I/O	SDA	2-wire serial interface data	3	
13		GND	Ground	1	1
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	3	
15	CML-O	Rx3n	Receiver Inverted Data Output	3	
16		GND	Ground	1	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	3	
18	CML-O	Rx1n	Receiver Inverted Data Output	3	
19		GND	Ground	1	1
20		GND	Ground	1	1
21	CML-O	Rx2n	Receiver Inverted Data Output	3	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	3	
23		GND	Ground	1	1
24	CML-O	Rx4n	Receiver Inverted Data Output	3	
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	3	
26		GND	Ground	1	1
27	LVTTL-O	ModPrsL	Module Present	3	
28	LVTTL-O	IntL/RxLOSL	Interrupt. Optionally configurable as RxLOSL via the management interface (SFF-8636). Interrupt. Optionally configurable as RxLOSL via the management interface (SFF-8636).	3	
29		Vcc Tx	+3.3V Power supply transmitter	2	2
30		Vcc1	+3.3V Power supply	2	2
31	LVTTL-I	LPMode/TxDis	Low Power Mode. Optionally configurable as TxDis via the management interface (SFF-8636).	3	
32		GND	Ground	1	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	3	
34	CML-I	Tx3n	Transmitter Inverted Data Input	3	
35		GND	Ground	1	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	3	
37	CML-I	Tx1n	Transmitter Inverted Data Input	3	
38		GND	Ground	1	1

Notes:

1. GND is the symbol for signal and supply (power) common for the module. All are common within the module and all module voltages are

referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane.

2. VccRx, Vcc1 and VccTx are applied concurrently and may be internally connected within the module in any combination. Vcc contacts in SFF-8662 and SFF-8672 each have a steady state current rating of 1 A.

Recommended Interface Circuit

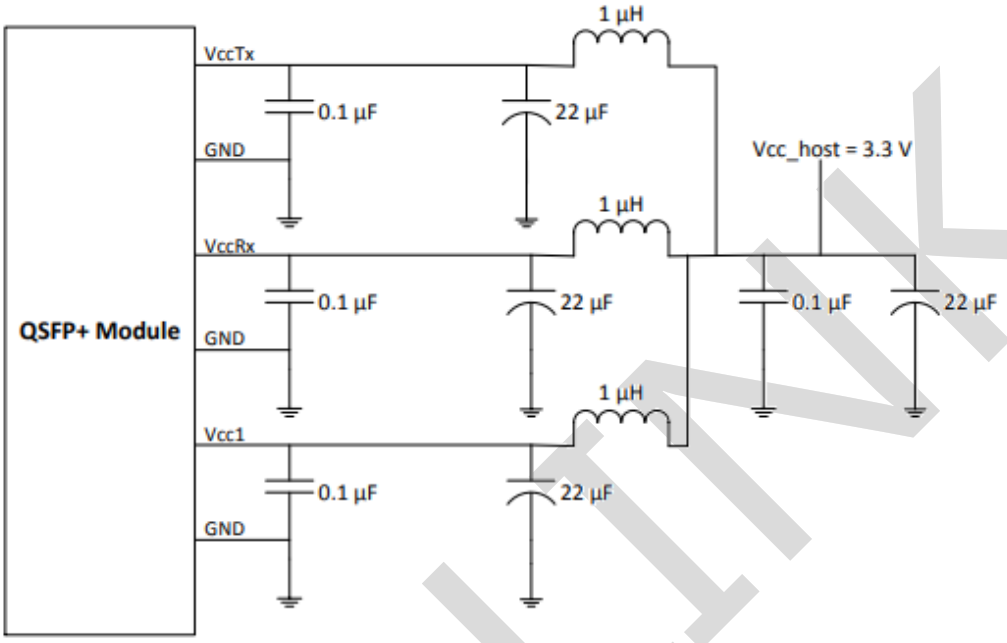
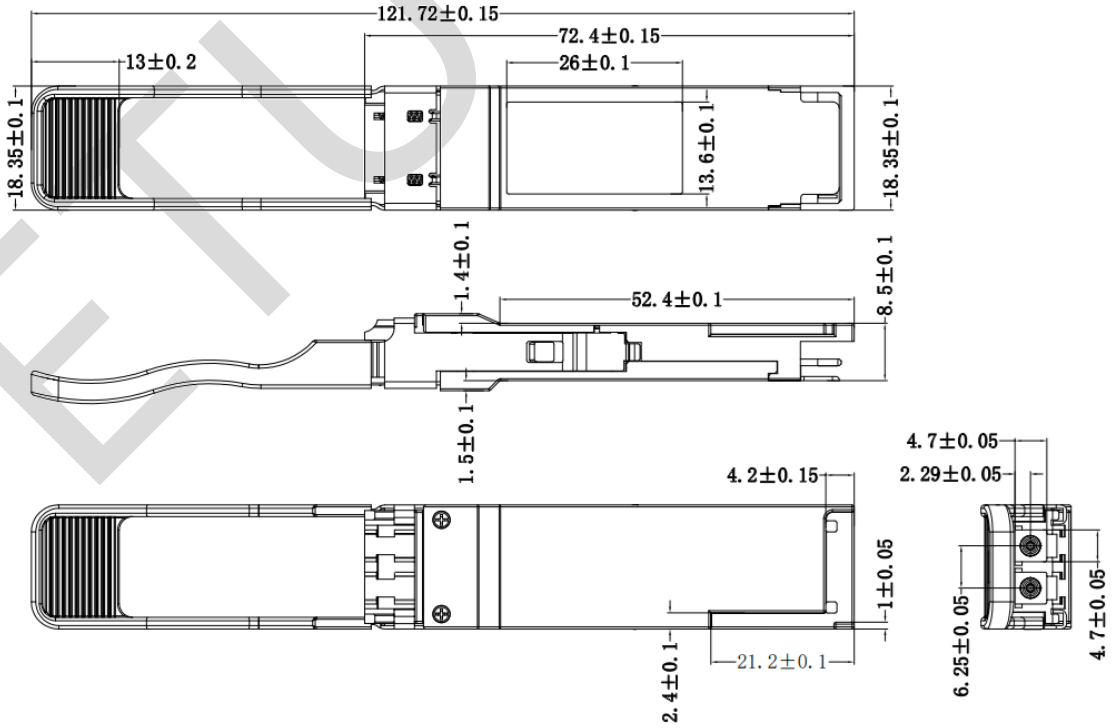


FIGURE 5-4 RECOMMENDED HOST BOARD POWER SUPPLY FILTERING

Mechanical Diagram



Revision History

Version No.	Date	Description
1.0	Oct 30, 2023	Preliminary datasheet
1.1	July 26, 2024	Format change

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