

DATA SHEET

UNIVISO-UXQ40E4

40Gb/s QSFP+ ER4 Optical Transceiver

UXQ40E4 Overview

UNIVISO's UXQ40E4 optical transceivers are based on Ethernet IEEE 802.3ba standard and SFF 8436 standard. The QSFP+ transceiver converts 4 inputs channels of 10Gb/s electrical data to 4 CWDM optical signals, and multiplexes them into a single channel for 40Gb/s optical transmission. Reversely, on the receiver side, the module optically de-multiplexes a 40Gb/s input into 4 CWDM channels signals, and converts them to 4 channel output electrical data. The central wavelengths of the 4 CWDM channels are 1271, 1291, 1311 and 1331 nm as members of the CWDM wavelength grid defined in ITU-T G694.2.

Product Features

- 4 CWDM Lanes MUX/DEMUX design
- Up to 11.2Gbps data rate per wavelength
- QSFP+ MSA compliant
- Duplex LC connector
- Built-in digital diagnostic functions
- Up to 40km on SMF
- Maximum 3.5W operation power
- RoHS Compliant
- Operating temperature range: 0°C to 70°C

Applications

- 40GBASE-ER4 Ethernet
- Infiniband QDR and DDR interconnects

Ordering Information

Part Number	Description	Color on Clasp
UXQ40E4	40G QSFP+ 1310nm LC Connectors, Up to 40km on SMF, with DOM function.	
Room 608, Yuanzheng Building B, Nanshan District, Shenzhen, China, 518052. Phone: 0086-755-86706025 Fax: 0086-755-86706026		

General Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Bit Error Rate	BER			10^{-12}		
Operating Temperature	T _{OP}	0		70	°C	1
Storage Temperature	T _{STO}	-40		85	°C	2
Input Voltage	V _{CC}	3.14	3.3	3.46	V	
Maximum Voltage	V _{MAX}	-0.5		3.6	V	3

Notes:

1. Case temperature
2. Ambient temperature
3. For electrical power interface

Optical - Characteristics - Transmitter

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Total Output Optical Power	P_T			10.5	dBm	1
Average Launch Power (Each Lane)	P_{TX}	-2.7		4.5	dBm	
Optical Center Wavelength	λ_C	1264.5	1271	1277.5	nm	2
	λ_C	1284.5	1291	1297.5	nm	3
	λ_C	1304.5	1311	1317.5	nm	4
	λ_C	1324.5	1331	1337.5	nm	5
Optical Modulation Amplitude, Each Lane	OMA	0.3		5	dB	
Extinction Ratio	ER	5.5			dB	
Side Mode Suppression Ratio	SMSR	30			dB	
Relative Intensity Noise	RIN			-128	dB/Hz	
Transmitter Dispersion Penalty	TDP			2.6	dB	
Optical Return Loss Tolerance	TOL			20	dB	
Transmitter Eye Mask	Compliant with IEEE 802.3ba					
Launch Power of OFF Transmitter	P_{OUT_OFF}			-30	dBm	1

Note:

1. Average
2. L0 Lane
3. L1 Lane
4. L2 Lane
5. L3 Lane

Optical - Characteristics - Receiver

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Optical Center Wavelength	λ_C	1264.5	1271	1277.5	nm	1
	λ_C	1284.5	1291	1297.5	nm	2
	λ_C	1304.5	1311	1317.5	nm	3
	λ_C	1324.5	1331	1337.5	nm	4
Optical Input Power, each lane	P_{RX}	-21.2		-4.5	dBm	5
Damage Threshold, each lane	P	3.8			dBm	
Receiver Sensitivity (OMA), each Lane	R_{X_SEN1}			-19	dBm	
Stressed Receiver Sensitivity in OMA, each Lane				-16.8	dBm	
LOS Assert	LOS_A	-35			dBm	
LOS De-Assert	LOS_D			-20	dBm	
LOS Hysteresis	LOS_H	0.5			dB	

Notes:

1. L0 Lane
2. L1 Lane
3. L2 Lane
4. L3 Lane
5. Average, Informative

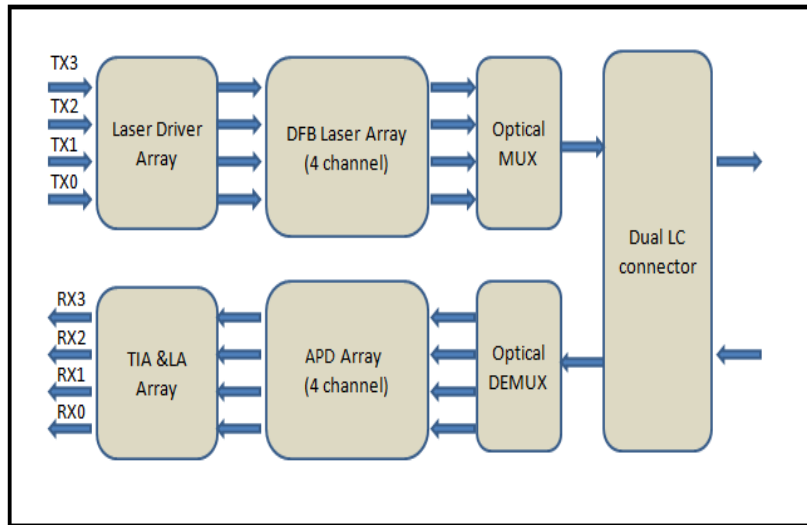
Electrical - Characteristics - Transmitter

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Input differential impedance	R_{IN}		100		Ω	
Differential data input swing	V_{IN_PP}	190		700	mV	
Transmit Disable Voltage	V_D	$V_{CC}-1.3$		V_{CC}	V	
Transmit Enable Voltage	V_{EN}	V_{EE}		$V_{EE}+0.8$	V	

Electrical - Characteristics - Receiver

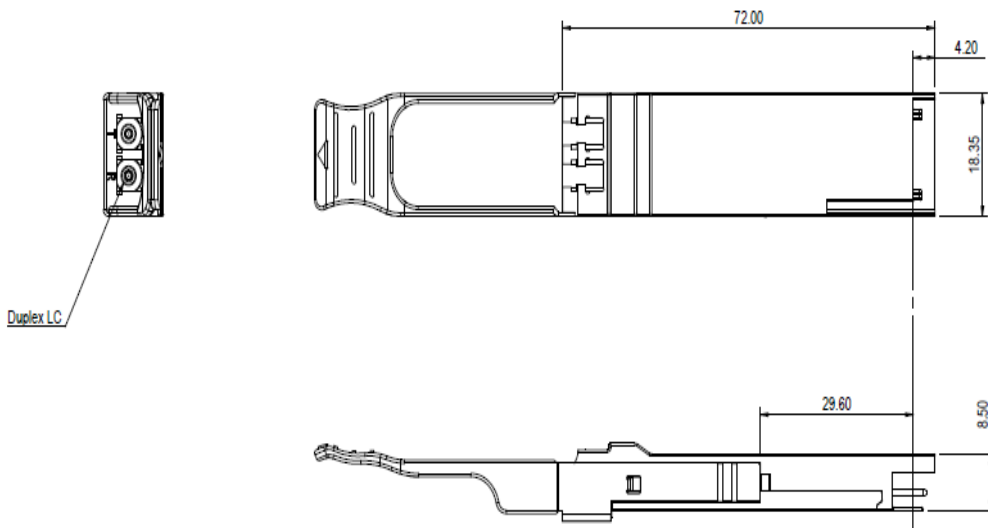
Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Differential data output swing	V_{OUT_PP}	300		850	mV	
Data output rise time (20%-80%)	T_R		30		ps	
Data output fall time(20%-80%)	T_F		30		ps	
LOS Fault	V_{LOS_A}	$V_{CC}-1.3$		V_{CC_HOST}	V	
LOS Normal	V_{LOS_D}	V_{EE}		$V_{EE}+0.5$	V	

Block-Diagram-of-Transceiver



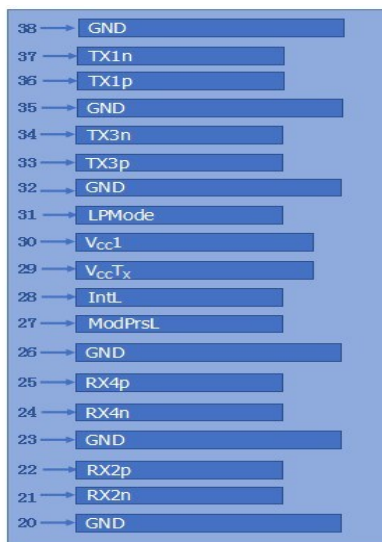
This product converts the 4-channel 10Gb/s electrical input data into CWDM optical signals (light), by a driven 4-wavelength Distributed Feedback Laser (DFB) array. The light is combined by the MUX parts as a 40Gb/s data, propagating out of the transmitter module from the SMF. The receiver module accepts the 40Gb/s CWDM optical signals input, and de-multiplexes it into 4 individual 10Gb/s channels with different wavelength. Each wavelength light is collected by a discrete photo diode, and then outputted as electric data after amplified by a TIA.

Dimensions

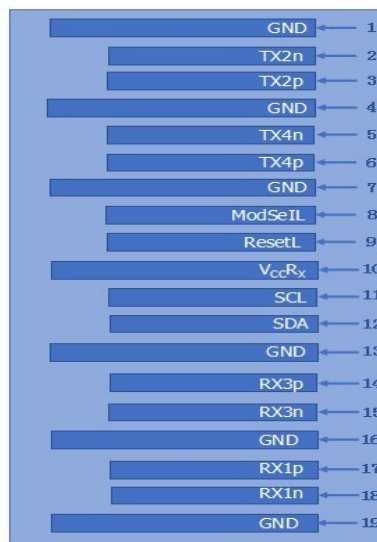


ALL DIMENSIONS ARE $\pm 0.2\text{mm}$ UNLESS OTHERWISE SPECIFIED
UNIT: mm

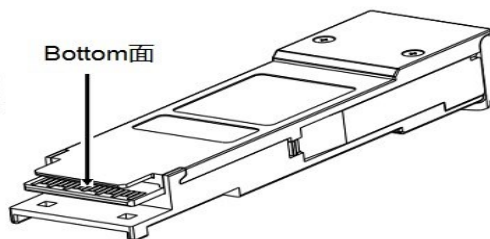
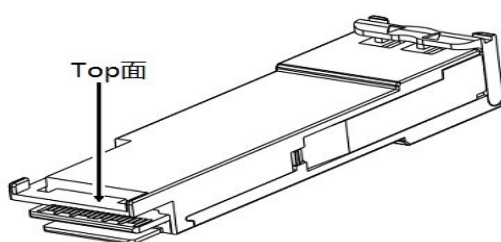
Electrical Pad Layout



Top of Board



Bottom of Board



Pin Assignment

PIN #	Symbol	Description	Remarks
1	GND	Ground	
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	V _{cc} R _X	+3.3V Power Supply Receiver	
11	SCL	2-wire serial interface clock	
12	SDA	2-wire serial interface data	
13	GND	Ground	
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Ground	
20	GND	Ground	
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	
24	Rx4n	Receiver Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	V _{cc} T _X	+3.3V Power Supply transmitter	
30	V _{cc} 1	+3.3V Power Supply	
31	LPMMode	Low Power Mode	
32	GND	Ground	
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	

35	GND	Ground	
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	

References

1. IEEE standard 802.3ba. IEEE Standard Department, 2010.
2. QSFP+ 10Gbs 4X PLUGGABLE TRANSCEIVER -SFF-8436