
UTQ40L2L

40Gbps QSFP CWDM 1310nm 20KM LR4 LC Transceiver

Features

- ◆ Four 10Gbps CWDM channels in the 1310nm band
- ◆ Digital Diagnostics Monitoring Interface
- ◆ Utilizes two standard LC optical connector
- ◆ Up to 20km reach for G.652 SMF
- ◆ Hot Pluggable
- ◆ DFBs and PIN monitor photodiodes array for transmitter section
- ◆ PIN detectors and TIAs array for receiver section
- ◆ Commercial operating case temperature range: -5°C to 70°C
- ◆ RoHS-6 Compliant

Application

- ◆ 40GBASE-LR4 Ethernet links
- ◆ Infiniband QDR and DDR interconnects client - side
- ◆ 40G Telecom connections

Standard

- ◆ Compliant to IEEE 802.3ba
- ◆ Compliant with QSFP+ MSA
- ◆ Compliant to SFF-8436

General Description

The UTQ40L2L is a transceiver module designed for 20km optical communication applications. The design is compliant to 40GBASE-LR4 of the IEEE P802.3ba standard. The module converts 4 inputs channels of 10Gbps 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. It contains a duplex LC connector for the optical interface and a 148-pin connector for the electrical interface. To minimize the optical dispersion in the long-haul system, single-mode fiber (SMF) has to be used. The product is designed with form factor, optical/electrical connection and digital diagnostic interface according to the QSFP Multi-Source

Agreement (MSA). It has been designed to meet the harshest external operating conditions including temperature, humidity and EMI interference.

Specification:

Absolute Maximum Ratings				
Parameter	Symbol	Min	Max	Unit
Storage Ambient Temperature	T _{STG}	-40	85	°C
Operating Humidity	H _o	5	95	%
Power Supply Voltage	V _{cc}	-0.5	3.6	V

Recommended Operating Conditions					
Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	T _c	-5		70	°C
Power Supply Voltage	V _{cc}	3.135	3.3	3.465	V
Power Supply Current	I _{CC}			1000	mA
Power Dissipation	PD			3.5	W
Aggregate Bit Rate	BRAVE		41.25		Gbps
Data Rate,each Lane	BRAVE		10.3125		Gbps
Fiber Length 9/125µm core SMF		-	20	-	km

Electrical transmitter Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Single ended input voltage tolerance		-0.3		4	V	
AC common mode input voltage tolerance		15			mV	RMS
Input Impedance (Differential)	Z _{in}	85	100	115	ohms	R _{in} > 100 kohms @ DC
TX Disable	Disable	V _{IH}	2	V _{cc} +0.3	V	
	Enable	V _{IL}	0	0.8		
TX FAULT	Fault	V _{OH}	2.4	V _{cc} +0.3	V	
	Normal	V _{OL}	0	0.8		

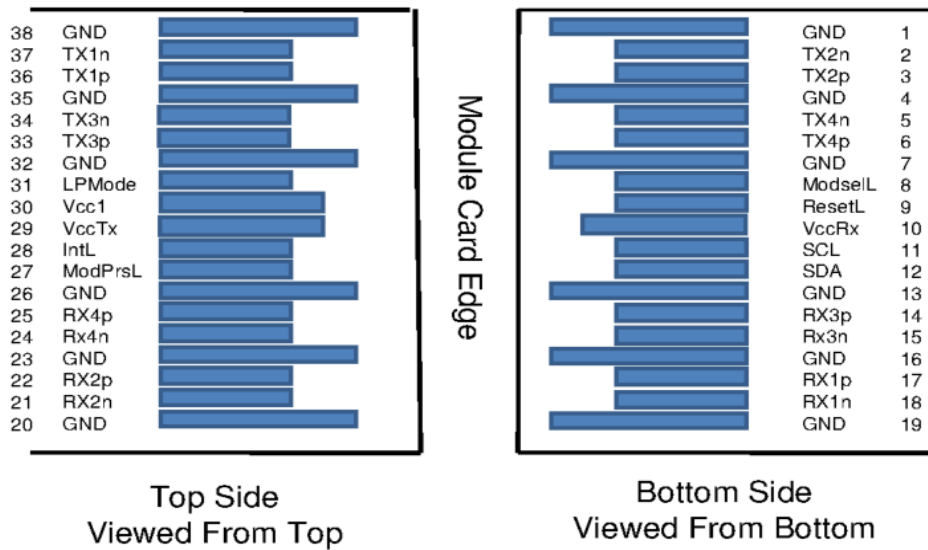
Electrical receiver Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Single ended output voltage		-0.3		4	V	
AC common mode voltage				7.5	mV	RMS
Termination mismatch at 1MHz				5	%	

Input Impedance (Differential)		Zin	85	100	115	ohms	
RX_LOS	LOS	VoH	2.4		Vcc+0.3	V	
	Normal	VoL	0		0.8		
Rise Time		tr			30	ps	10%~90%
Fall Time		tf			30	ps	10%~90%

Optical transmitter Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Launched Power (avg.)	Pavg	-3		2.3	dBm	
Per Lane Bit Rate	Er		3.5		dB	
Wavelength Assignment	λ_0	1264.5	1271	1277.5	nm	
	λ_1	1284.5	1291	1297.5		
	λ_2	1304.5	1311	1317.5		
	λ_3	1324.5	1331	1337.5		
Spectral Width(-20dB)	$\Delta\lambda$			1	nm	
Output Eye Diagram	IEEE 802.3ba-2010 Compliant					

Optical receiver Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Damage threshold			3.3		dBm	
Receiver sensitivity in OMA, each lane	Pmins			-12	dBm	
Maximum Receive Power, each lane	Pmax	2.3			dBm	
Receiver reflectance	Rr			-26	dB	
LOS	Optical De-assert	LOSD		-11.5	dBm	
	Optical Assert	LOSA	-20			

Pin Definition


Figure1 QSFP MSA-compliant 38-pin connector

Pin	Symbol	Name/Description	Notes
1	GND	Transmitter Ground (Common with Receiver Ground)	1
2	TX2N	Transmitter Inverted Data Input	
3	TX2P	Transmitter Non-Inverted Data Input	
4	GND	Ground	1
5	TX4N	Transmitter Inverted Data Input	
6	TX4P	Transmitter Non-Inverted Data Input	
7	GND	Ground	1
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	Vcc Rx	+3.3 V Power supply receiver	2
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	1
17	RX1P	Receiver Non-Inverted Data Output	
18	RX1N	Receiver Inverted Data Output	
19	GND	Ground	1
20	GND	Ground	1
21	RX2N	Receiver Inverted Data Output	
22	RX2P	Receiver Non-Inverted Data Output	

23	GND	Ground	1
24	RX4N	Receiver Inverted Data Output	1
25	RX4P	Receiver Non-Inverted Data Output	
26	GND	Ground	1
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	Vcc Tx	+3.3 V Power supply transmitter	2
30	Vcc1	+3.3 V Power Supply	2
31	LPMode	Low Power Mode	
32	GND	Ground	1
33	TX3P	Transmitter Non-Inverted Data Input	
34	TX3N	Transmitter Inverted Data input	
35	GND	Ground	1
36	TX1P	Transmitter Inverted Data Input	
37	TX1N	Transmitter Non-Inverted Data Input	
38	GND	Ground	1

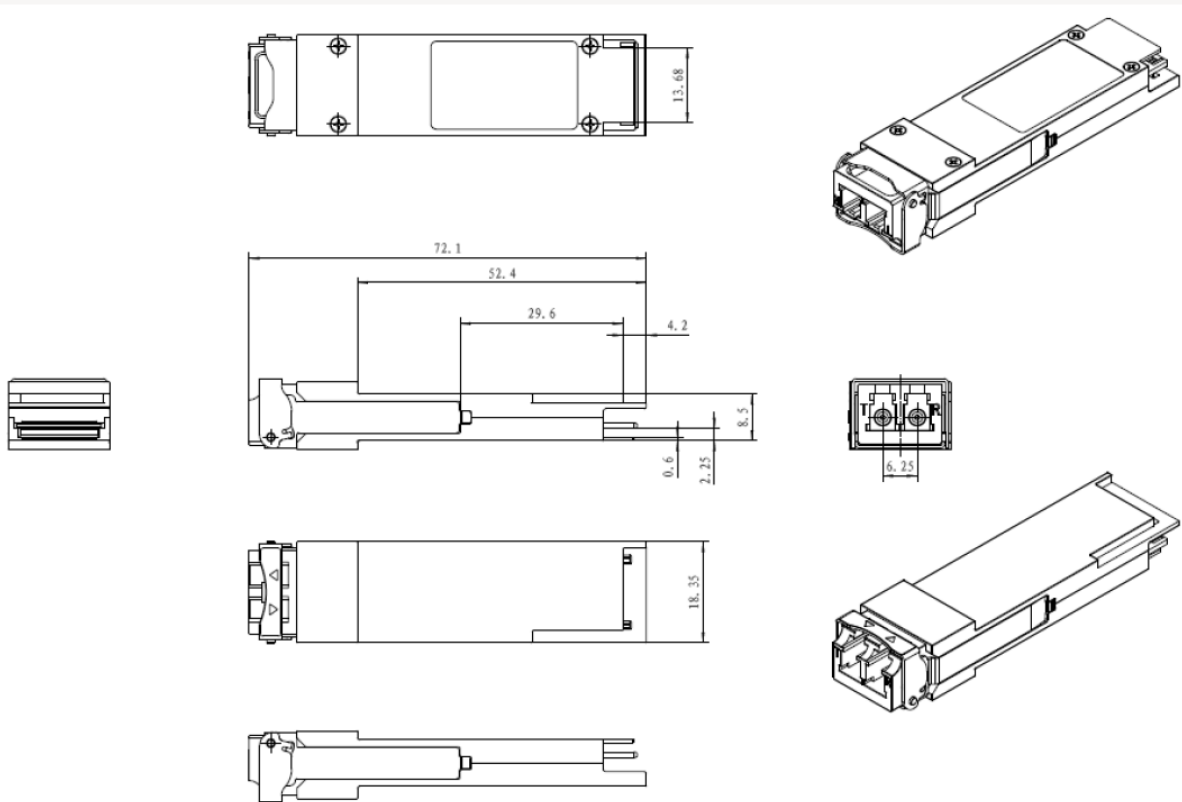
Table 1: QSFP Module PIN Definition

Notes:

1. All Ground (GND) are common within the QSFP+ module and all module voltages are referenced to this potential unless noted otherwise. Connect these directly to the host board signal common ground plane.
2. VccRx, Vcc1 and VccTx are the receiving and transmission power suppliers and shall be applied concurrently. The connector pins are each rated for a maximum current of 500mA.

Package Outline

Dimensions are in millimeters. All dimensions are $\pm 0.1\text{mm}$ unless otherwise specified.
(Unit: mm)



Regulatory Compliance

Feature	Test	Method
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1(>1000V for SFI pins, >2000Vfor other pins.)
Electrostatic Discharge (ESD) Immunity	IEC61000-4-2	Class 2(>4.0kV)
Electromagnetic Interference (EMI)	CISPR22 ITE Class B FCC Class B CENELEC EN55022 VCCI Class 1	Comply with standard
Immunity	IEC61000-4-3	Comply with standard
Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN (IEC) 60825-1,2	Compatible with Class I Laser Product