WTQ40Z8

40G QSFP Transceiver 1310nm SMF 80km LC

Part Number **WTQ40Z8**	**Data Rate 40G**	**Wavelength** **4xLWDM EML**
Reach 80	**Temperature** **0℃~70℃**	



1. Product Overview

The WTQ40Z8 is a transceiver module designed for 80km optical communication applications. The design is compliant to 40GBASE-ZR4 of the IEEE P802.3ba standard. The module converts 4 inputs channels of 10Gb/s electrical data to 4 LWDM 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 4LWDM channels signals, and converts them to 4 channel output electrical data.

The central wavelengths of the 4 LANWDM channels are 1296nm, 1300nm, 1305nm and 1309nm as members of the LAN WDM wavelength grid defined in ITU-T G694.2. It contains a duplex LC connector for the optical interface and a 38-pin connector for the electrical interface. To minimize the optical dispersion in the long-haul system, single-mode fiber (SMF) has to be applied in this module.

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.

The module operates from a single +3.3V power supply and LVCMOS/LVTTL global control signals such as Module Present, Reset, Interrupt and Low Power Mode are available with the modules. A 2-wire serial interface is available to send and receive more complex control signals and to obtain digital diagnostic information. Individual channels can be addressed and unused channels can be shut down for maximum design flexibility.

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Features

- 4 lanes MUX/DEMUX design
- Integrated LAN WDM TOSA / ROSA
- Up to 11.2Gbps per channel bandwidth
- Aggregate bandwidth of > 40Gbps
- Duplex LC connector
- Compliant with 40G Ethernet IEEE802.3ba and 40GBASE-ZR4
- QSFP MSA compliant
- APD photo-detector
- Up to 80 km transmission
- Compliant with QDR/DDR InfiniBand data rates
- Single +3.3V power supply operating
- Built-in digital diagnostic functions

Applications

- Rack to rack
- Data centers Switches and Routers
- Metro networks
- Switches and Routers
- 40G BASE-ZR4

2. Ordering Information

Part No.	Bit Rate (Gbps)	Laser (nm)	Distance（km）	Fiber Type	Temp
WTQ40Z8	40G	4xLWDM EML	80	SMF	0℃~70℃

3. Absolute Maximum Ratings

Parameter	Symbol	Min	Type	Max	Unit
Storage Temperature	TS	-40		+85	°C
Supply Voltage	VCCT, R	-0.5		4	V
Relative Humidity	RH	0		85	%

4. Recommended Operating Conditions

Parameters	Symbol	Min.	Typical	Max	Unit
Case operating Temperature	TC	0		+70	°C
Supply Voltage	VCCT, R	+3.13	3.3	+3.47	V
Supply Current	ICC			1.3	A
Power Dissipation	PD			5	W

5. Optical Parameters

Parameters	Symbol	Min.	Typical	Max	Unit
Transmitter	Transmitter	Transmitter	Transmitter	Transmitter	Transmitter
Wavelength Assignment	L0	1294.53	1295.56	1296.59	nm

Parameters	Symbol	Min.	Typical	Max	Unit
Wavelength Assignment	L1	1299.02	1300.05	1301.09	nm
Wavelength Assignment	L2	1303.54	1304.58	1305.63	nm
Wavelength Assignment	L3	1308.09	1309.14	1310.19	nm
Side-mode Suppression Ratio	SMSR	30	-	-	dB
Total Average Launch Power	PT		-	10.5	dBm
Average Launch Power, each Lane		+4	-	7	dBm
Transmit OMA per Lane	TxOMA	0.3		5.0	dBm
Difference in launch power between any two lanes (OMA)				4.7	dB
Transmitter Dispersion Penalty each Lane	TDP			2.6	dB
Extinction Ratio	ER	5.5	6.5		dB
Transmitter Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3}		{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}			
Optical Return Loss Tolerance		-	-	20	dB
Average Launch Power OFF Transmitter, each Lane	Poff			-30	dBm
Relative Intensity Noise	Rin			-128	dB/HZ
Optical Return Loss Tolerance		-	-	12	dB
Damage Threshold	THd	0			dBm
Average Power at Receiver Input, each Lane	R	-24		-6	dBm
Receive Electrical 3 dB upper Cut off Frequency, each Lane				12.3	GHz
RSSI Accuracy		-2		2	dB
Receiver Reflectance	Rrx			-26	dB
Receiver Power (OMA), each Lane		-	-	-4	dBm
Receive Electrical 3 dB upper Cutoff Frequency, each Lane				12.3	GHz
LOS De-Assert	LOSD			-25	dBm
LOS Assert	LOSA	-35			dBm
LOS Hysteresis	LOSH	0.5			dB

6. Electrical Characteristics

Parameters	Symbol	Min.	Typical	Max	Unit	Note
Data Rate per Channel		-	10.3125	11.2	Gbps	
Power Consumption		-	2.5	5	W	
Supply Current	Icc		0.75	1.3	A	
Control I/O Voltage-High	VIH	2.0		Vcc	V	
Control I/O Voltage-Low	VIL	0		0.7	V	
Inter-Channel Skew	TSK			150	Ps	
RESETL Duration			10		Us	
RESETL De-assert time				100	ms	
Power On Time				100	ms	
Transmitter	Transmitter	Transmitter	Transmitter	Transmitter	Transmitter	Transmitter
Single Ended Output Voltage Tolerance		0.3		4	V	1
Common mode Voltage Tolerance		15			mV	
Transmit Input Diff Voltage	VI	150		1200	mV	
Transmit Input Diff Impedance	ZIN	85	100	115		
Data Dependent Input Jitter	DDJ		0.3		UI	
Receiver	Receiver	Receiver	Receiver	Receiver	Receiver	Receiver
Single Ended Output Voltage Tolerance		0.3		4	V	
Rx Output Diff Voltage	Vo	370	600	950	mV	
Rx Output Rise and Fall Voltage	Tr/Tf			35	ps	1
Total Jitter	TJ		0.3		UI	

7. Digital Diagnostics

Parameter	Symbol	Max	Unit	Conditions
Initialization Time	t_init	2000	ms	Time from power on1, hot plug or rising edge of Reset until the module is fully functional2
Reset Init Assert Time	t_reset_init	2	μs	A Reset is generated by a low level longer than the minimum reset pulse time present on the ResetL pin.

Parameter	Symbol	Max	Unit	Conditions
Serial Bus Hardware Ready Time	t_serial	2000	ms	Time from power on1 until module responds to data transmission over the 2-wire serial bus
Monitor Data Ready Time	t_data	2000	ms	Time from power on1 to data not ready, bit 0 of Byte 2, deasserted and IntL asserted
Reset Assert Time	t_reset	2000	ms	Time from rising edge on the ResetL pin until the module is fully functional2
LPMode Assert Time	ton_LPMode	100	μs	Time from assertion of LPMode (Vin:LPMode =Vih) until module power consumption enters lower Power Level
IntL Assert Time	ton_IntL	200	ms	Time from occurrence of condition triggering IntL until Vout:IntL = Vol
IntL Deassert Time	toff_IntL	500	μs	toff_IntL 500 μs Time from clear on read3 operation of associated flag until Vout:IntL = Voh. This includes deassert times for Rx LOS, Tx Fault and other flag bits.
Rx LOS Assert Time	ton_los	100	ms	Time from Rx LOS state to Rx LOS bit set and IntL asserted
Flag Assert Time	ton_flag	200	ms	Time from occurrence of condition triggering flag to associated flag bit set and IntL asserted
Mask Assert Time	ton_mask	100	ms	Time from mask bit set4 until associated IntL assertion is inhibited
Mask De-assert Time	toff_mask	100	ms	Time from mask bit cleared4 until associated IntlL operation resumes
ModSelL Assert Time	ton_ModSelL	100	μs	Time from assertion of ModSelL until module responds to data transmission over the 2-wire serial bus
ModSelL Deassert Time	toff_ModSelL	100	μs	Time from deassertion of ModSelL until the module does not respond to data transmission over the 2-wire serial bus
Power_over-ride or Power-set Assert Time	ton_Pdown	100	ms	Time from P_Down bit set 4 until module power consumption enters lower Power Level
Power_over-ride or Power-set De- assert Time	toff_Pdown	300	ms	Time from P_Down bit cleared4 until the module is fully functional3

8. Pin Descriptions

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

9. Pin Descriptions

20		GND	Ground	1
21	CML-O	Rx2n	Receiver Inverted Data Output	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	
23		GND	Ground	1
24	CML-O	Rx4n	Receiver Inverted Data Output	
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	
26		GND	Ground	1
27	LVTTL-O	ModPrsL	Module Present	

20		GND	Ground	1
28	LVTTL-O	IntL	Interrupt	
29		VccTx	+3.3V Power Supply Transmitter	2
30		Vcc1	+3.3V Power Supply	2
31	LVTTL-I	LPMode	Low Power Mode	
32		GND	Ground	1
33	CML-I	Tx3p	Transmitter Inverted Data Output	
34	CML-I	Tx3n	Transmitter Non-Inverted Data Output	
35		GND	Ground	1
36	CML-I	Tx1p	Transmitter Inverted Data Output	
37	CML-I	Tx1n	Transmitter Non-Inverted Data Output	
38		GND	Ground	1

10. EEPROM Memory Map

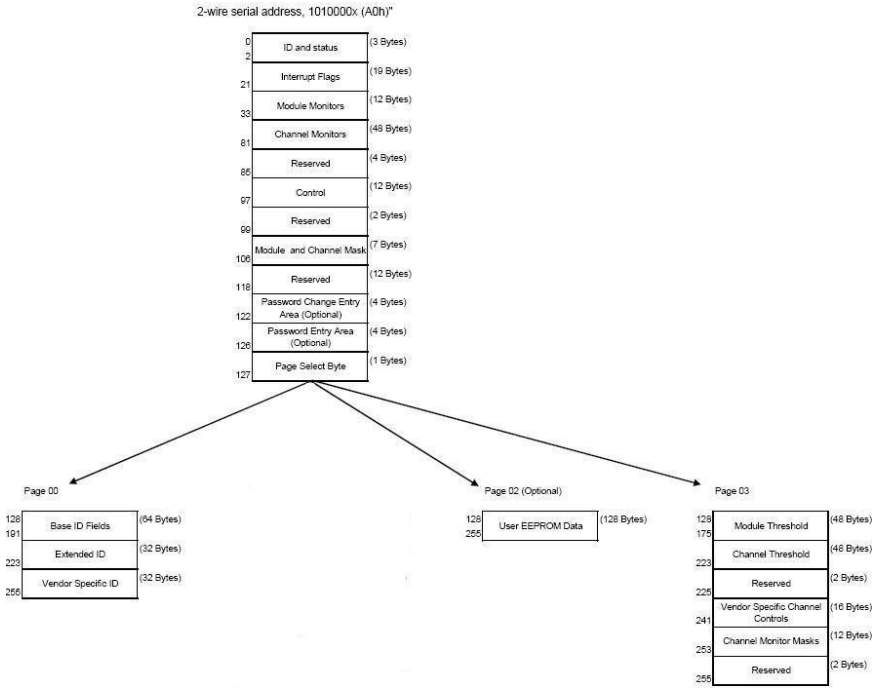
Data Address	Length (Byte)	Name of Length	Description and Contents
Base ID Fields	Base ID Fields	Base ID Fields	Base ID Fields
128	1	Identifier	Identifier Type of serial Module(D=QSFP+)
129	1	Ext. Identifier	Extended Identifier of Serial Module(90=2.5W)
130	1	Connector	Code of connector type(7=LC)
131-138	8	Specification compliance	Code for electronic compatibility or optical compatibility(40GBASE-LR4)
139	1	Encoding	Code for serial encoding algorithm(5=64B66B)

11. Additional Specifications

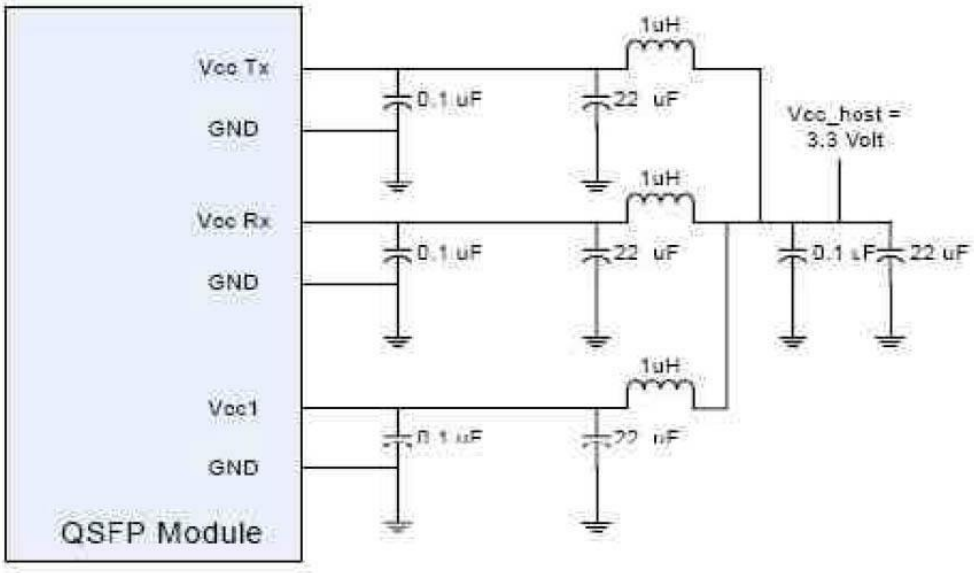
140	1	BR, Nominal	Nominal bit rate, units of 100 MBits/s(6C=108)
141	1	Extended rateselect Compliance	Tags for extended rate select compliance
142	1	Length (SMF)	Link length supported for SMF fiber in km (28=80km)
143	1	Length (OM3 50um)	Link length supported for EBW 50/125um fiber (OM3), units of 2m
144	1	Length (OM2 50um)	Link length supported for 50/125um fiber (OM2), units of 1m
145	1	Length (OM1 62.5um)	Link length supported for 62.5/125um fiber (OM1), units of 1m

140	1	BR, Nominal	Nominal bit rate, units of 100 MBits/s(6C=108)
146	1	Length (Copper)	Link length of copper or active cable, unites of 1m Link length supported for 50/125um fiber (OM4), units of 2m when Byte 147 declares 850nm VCSEL as defined in Table 37
147	1	Device tech	Device technology
148-163	16	Vendor name	QSFP+ vendor name: ASCII Format
164	1	Extended Module	Extended Module codes for InfiniBand
165-167	3	Vendor OUI	Order-specific registered OUI
168-183	16	Vendor PN	Part number: ASCII Format
184-185	2	Vendor rev	Revision level for part number provided by vendor (ASCII) (X1)
186-187	2	Wave length or Copper cable Attenuation	Nominal laser wavelength (wavelength=value/20 in nm) or copper cable attenuation in dB at 2.5GHz (Adrs 186) and 5.0GHz (Adrs 187) (65A4=1301)
188-189	2	Wavelength tolerance	Guaranteed range of laser wavelength (+/- value) from nominal wavelength. (Wavelength Tol. =value/200 in nm) (1C84=36.5)
190	1	Max case temp.	Maximum case temperature in degrees C (70)
191	1	CC_BASE	Check code for base ID fields (addresses 128-190)
Extended ID fields	Extended ID fields	Extended ID fields	Extended ID fields
192-195	4	Options	Rate Select, TX Disable, Tx Fault, LOS, Warning indicators for: Temperature, VCC, RX, power, TX Bias
196-211	16	Vendor SN	Serial number provided by vendor (ASCII)
212-219	8	Date Code	Vendor's manufacturing date code
220	1	Diagnostic Monitoring Type	Indicates which types of diagnostic monitoring are implemented (if any) in the Module. Bit 1, 0 Reserved (8=Average Power)
221	1	Enhanced Options	Indicates which optional enhanced features are implemented in the Module.
222	1	Reserved	Reserved
223	1	CC_EXT	Check code for the Extended ID Fields (addresses 192-222)
Vendor Specific ID Fields	Vendor Specific ID Fields	Vendor Specific ID Fields	Vendor Specific ID Fields
224-255	32	Vendor Specific EEPROM	Vendor Specific EEPROM

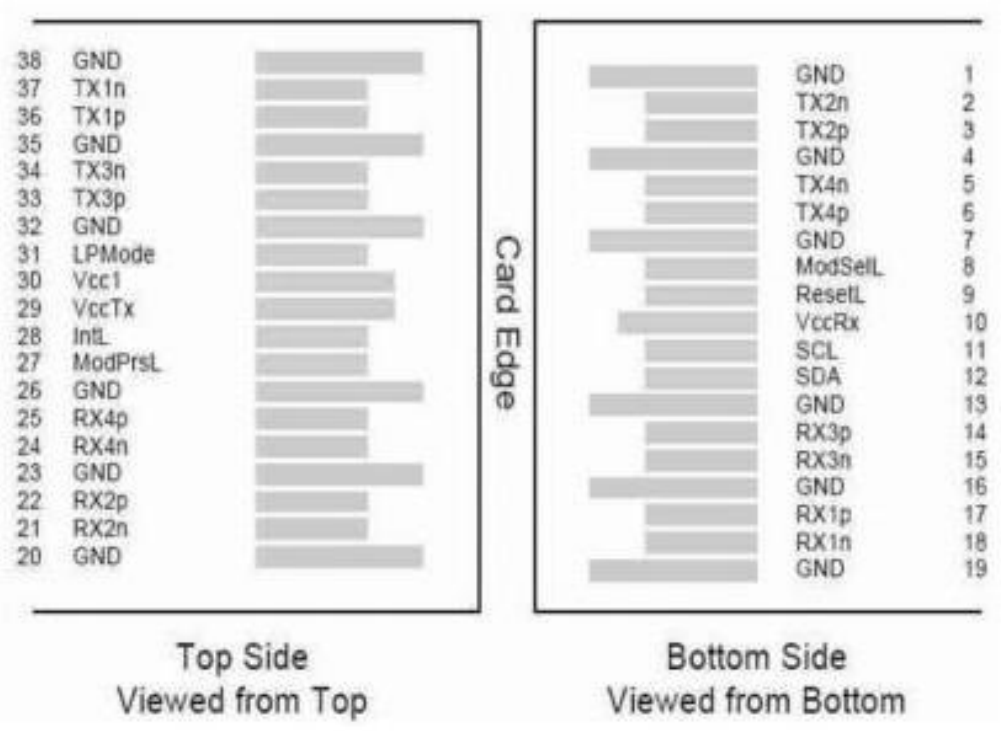
12. Digital Diagnostics Memory Map



13. Recommended Interface Circuit



14. Pin Assignment



15. Revision History

Version	Date	Description	Prepared by
V6	2025	Unified WincoTek datasheet format	WincoTek
V6.1	2026-10-23	Engineering and format review	WincoTek