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# MQA4Z10-D0C-T1

## Features

- ◆ Supports 41.25Gb/s aggregate bit rate
- ◆ Integrated 4 CWDM lanes MUX/DEMUX
- ◆ Up to 10km transmission on single mode fiber (SMF)
- ◆ XLPP1 electrical interface
- ◆ Duplex LC receptacles
- ◆ Hot pluggable QSFP+ form factor
- ◆ Maximum power consumption 3.5W
- ◆ Case operating temperature range: 0°C~+70°C
- ◆ RoHS Compliant
- ◆ DDMI function available with internally calibrated mode
- ◆ I2C management interface

## Applications

- ◆ Data Center
- ◆ Ethernet Switches

## Standards

- ◆ Compliant with IEEE802.3ba
- ◆ Compliant with SFF-8436
- ◆ RoHS Compliant

## General Description

Mentech 40G QSFP+ LR4 integrates four transmitters and receivers into one module. The central wavelengths of the channels are 1271, 1291, 1311 and 1331 nm as members of the CWDM wavelength grid defined in ITU-T G.694.2. In the transmitter side, the four lanes of optical data channels are optically multiplexed by the integrated optical multiplexer. In the receive side, the four lanes of optical data channels are optically de-multiplexed by the integrated optical de-multiplexer. Each data channels is recovered by a PIN photo-detector and trans-impedance amplifier, retimed.

The product is designed with form factor, optical/electrical connection and digital diagnostic interface according to the QSFP+ IEEE802.3ba 40GBASE-LR4 and compliant to SFF-8436.

## Specification

Absolute Maximum Ratings				
Parameter	Symbol	Min	Max	Unit
Storage Temperature	T <sub>STG</sub>	-40	85	°C
Relative Humidity	RH	0	85	%

Recommended Operating Conditions					
Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	T <sub>C</sub>	0		70	°C
Power Supply Voltage	V <sub>CC</sub>	3.135	3.3	3.465	V
Each Channel Data Rate			10.3125		Gbps
Operating Distance				10	km

Electrical Characteristics					
Parameter	Min	Typical	Max	Unit	Notes
Supply Current	I <sub>CC</sub>		1050	mA	1
Power Consumption	P <sub>W</sub>		3.5	W	

Optical transmitter Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Total Launched Power (avg.)	$P_{OUT}$			8.3	dBm	
Average launch power,each lane	$P_f$	-7		2.3	dBm	
Operating Wavelength Range	$\lambda_0$	1264.5		1277.5	nm	
	$\lambda_1$	1284.5		1297.5		
	$\lambda_2$	1304.5		1317.5		
	$\lambda_3$	1324.5		1337.5		
Side Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio	ER	3.5			dB	2
Transmitter and Dispersion Penalty	TDP			2.6	dB	
Transmit OMA per Lane	$TxOMA$	-6		3.5	dBm	
Transmitter Reflectance Tolerance				-12	dB	
Transmitter eye mask definition {X1,X2,X3,Y1,Y2,Y3}		{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}				
Optical Receiver Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Wavelength Range	$\lambda_0$	1264.5		1277.5	nm	
	$\lambda_1$	1284.5		1297.5		
	$\lambda_2$	1304.5		1317.5		
	$\lambda_3$	1324.5		1337.5		
Receiver Sensitivity(OMA)	$S_{OMA}$			-11.5	dBm	3
Average power at receiver input,each lane		-13.7		2.3	dBm	
Receiver Reflectance				-26	dB	
LOS	De-Assert	$LOS_D$		-15	dBm	
	Assert	$LOS_A$	-30		dBm	
LOS Hysteresis		0.5			dB	4

**Note1.** The supply current is QSFP+ module's working current.

**Note2.** For the measurements, the device was driven with  $2^{31}-1$  PRBS pattern

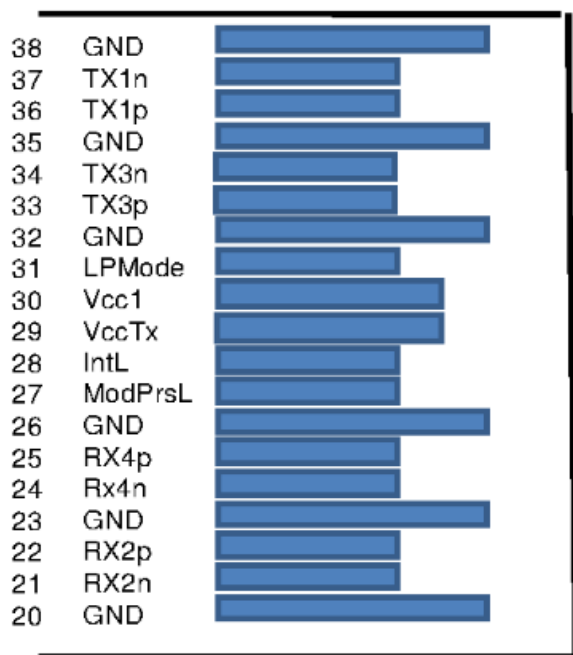
**Note3.** Measured with a PRBS 2<sup>31</sup>-1 test pattern, @10.3125Gbps, ER=4dB, BER<10<sup>-12</sup>

**Note4.** The LOS Hysteresis minimizes 'chatter' on the output line. In principle, Hysteresis alone does not guarantee chatter-free operation.

### Digital Diagnostic Monitoring Information

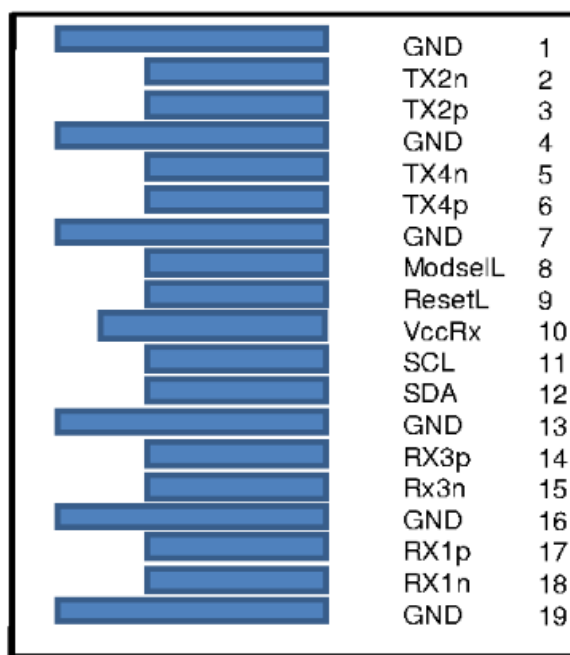
Parameter	Accuracy	Calibration	Note
Temperature	±3°C	Internal	0~70°C
Voltage	±3%	Internal	3.1~3.5V
Bias Current	±10%	Internal	Specified by normal value
TX Power	±2dB	Internal	-7~2.3dBm
RX Power	±2dB	Internal	-18~2.3dBm

### Pin definition



Top Side  
Viewed From Top

Module Card Edge



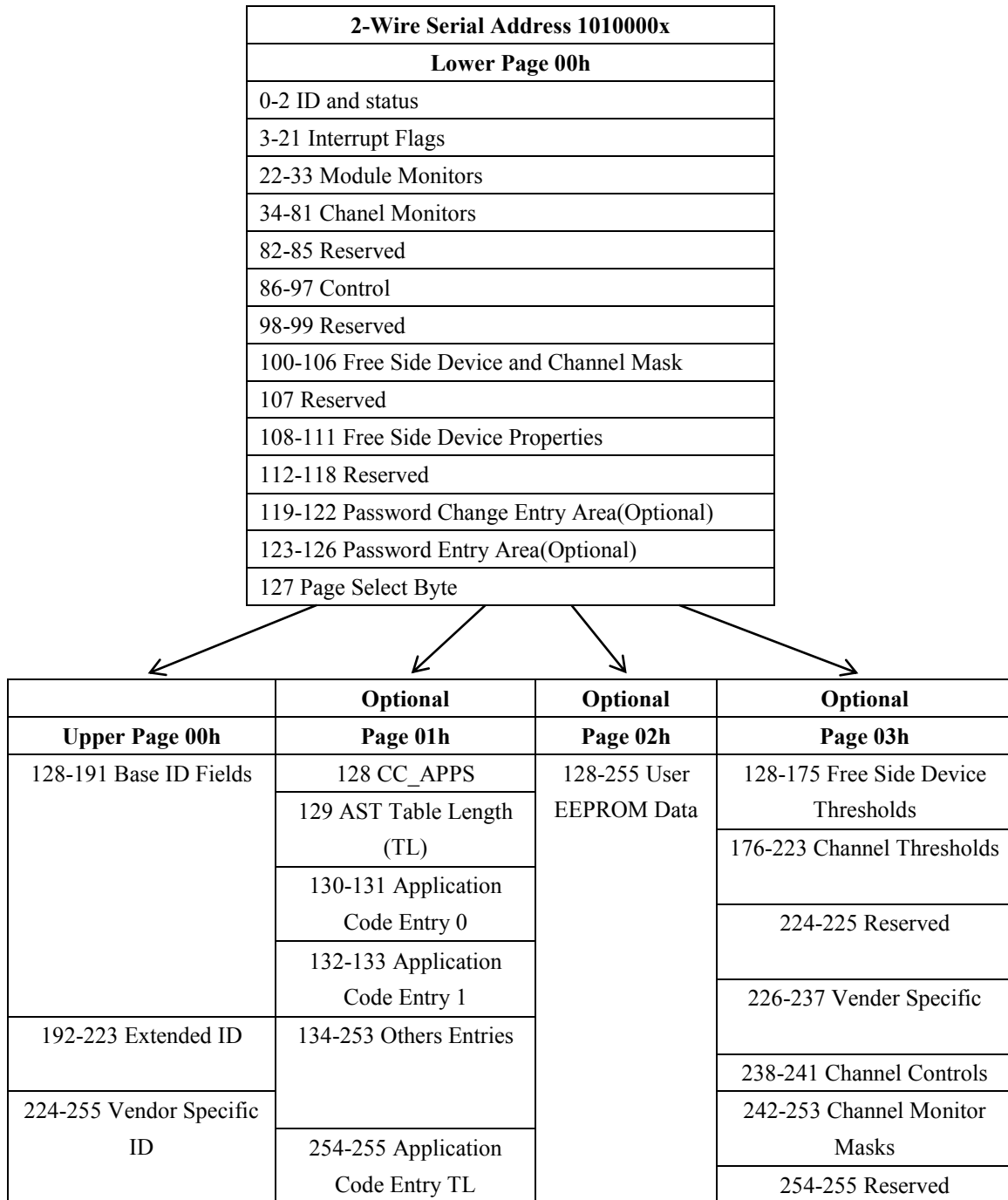
Bottom Side  
Viewed From Bottom

As Viewed Through Top of Board

Pin	Name	Function/Description	Note
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	VccRx	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 Non-Inverted Data Output.	
22	Rx2p	Receiver Inverted Data Output.	
23	GND	Ground.	
24	Rx4n	Receiver Non-Inverted Data Output.	
25	Rx4p	Receiver Inverted Data Output.	
26	GND	Ground.	
27	ModPrsl	Module Present	
28	IntL	Interrupt	
29	VccTx	3.3V power supply.	
30	Vcc1	3.3V power supply.	
31	LPMode	Low Power Mode	
32	GND	Ground.	
33	Tx3p	Transmitter Inverted Data Input	
34	Tx3n	Transmitter Non-Inverted Data Input	
35	GND	Ground.	

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

## Memory Map



QSFP+ Memory Map

**EEPROM Serial ID Memory Contents (Upper Memory Map Page 00h)**

Byte	Name	Description	Hex
128	Identifier	Identifier Type of serial Module	D
129	Ext. Identifier	Extended Identifier of serial Module	C0
130	Connector	Code for media connector type	07
131-138	Specification Compliance	Code for electronic compatibility or optical compatibility	02 00 00 00 10 00 01 00
139	Encoding	Code for serial encoding algorithm.	05
140	BR, nominal	Nominal bit rate, units of 100 Mbps/s	69
141	Extended Rate Select Compliance	Tags for extended rate select compliance	02
142	Length (SMF)	Link length supported for SMF fiber in km (note 1)	0A
143	Length (OM3 50 um)	Link length supported for EBW 50/125 um fiber (OM3), units of 2m (note 1)	00
144	Length (OM2 50 um)	Link length supported for 50/125 um fiber (OM2)	00
145	Length (OM162.5 um)	Link length supported for 62.5/125 um fiber (OM1), units of 1m (note 1)	00
146	Length(copper)	Link length of copper or active cable, units of 1 m (note 1)Link length supported for 50/125 um fiber (OM4), units of 2 m) when Byte 147 declares 850 nm VCSEL as defined in Table 37	00
147	Device tech	Device technology	28
148-163	Vendor name	QSFP+ vendor name (ASCII)	4d 45 4e 54 45 43 48 4f 50 54 4f 20 20 20 20 20
164	Extended Module	Extended Module codes for InfiniBand	00
165-167	Vendor OUI	QSFP+ vendor IEEE company ID	00 00 00
168-183	Vendor PN	Part number provided by QSFP+ vendor(ASCII) device vendor(ASCII)	4d 51 41 34 5A 31 30 2d 44 30 43 2d 54 31 20 20
184-185	Vendor rev	Revision level for part number provided by vendor(ASCII)	20 20
186-187	Wave length or Copper 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)	65 a4
188-189	Wavelength tolerance	Guaranteed range of laser wavelength(+/- value) from nominal wavelength.(wavelength Tol.=value/200 in nm)	05 14
190	Max case temp.	Maximum case temperature in degrees C	46
191	CC_BASE	Check code for base ID fields (addresses128-190)	BB

192-195	Options	Rate Select, TX Disable, TX Fault, LOS, Warning indicators for: Temperature, TX Bias	12 07 F0 60
196-211	Vendor SN	Serial number provided by vendor (ASCII)	4d 4e 43 31 39 33 4B 53 30 30 31 37 20 20 20 20
212-219	Date Code	Vendor's manufacturing date code	31 39 30 31 30 37 20 20
220	Diagnostic Monitoring Type	Indicates which types of diagnostic monitoring are implemented (if any) in the Module. Bit 1,0 Reserved	0c
221	Enhanced Options	Indicates which optional enhanced features are implemented in the Module	0c
222	Reserved		
223	CC_EXT	Check code for the Extended ID Fields (addresses 192-222)	54
224-225	Vendor Specific EEPROM	Vendor Specific EEPROM	00 00

**Free Side Device and Channel Thresholds (2-Wire Serial Address A0h Page 03h)**

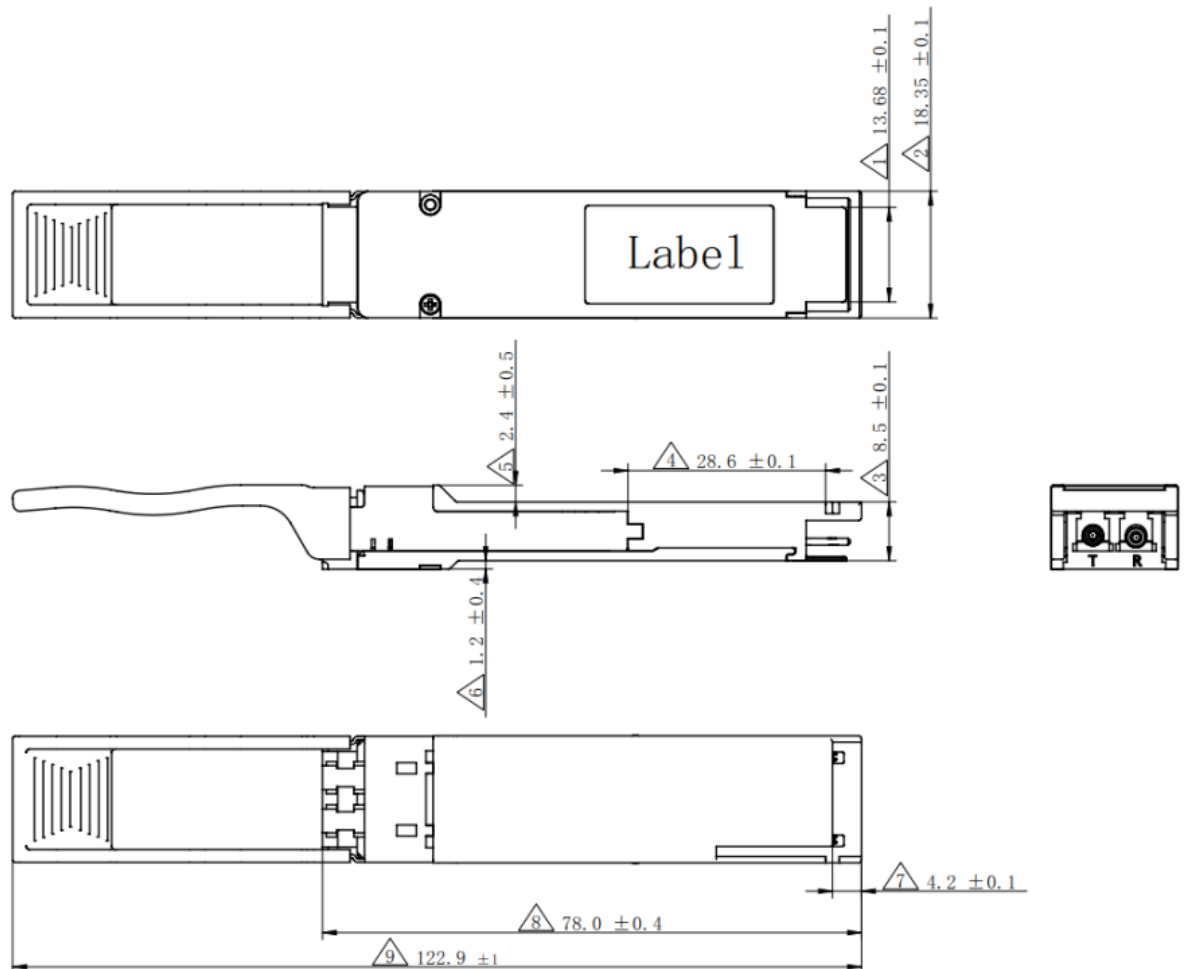
Address	Bytes	Name	Real Value	Unit	HEX
128-129	2	Temp High Alarm	80	°C	
130-131	2	Temp Low Alarm	-10	°C	
132-133	2	Temp High Warning	75	°C	
134-135	2	Temp Low Warning	-5	°C	
136-143	8	Reserved			
144-145	2	Vcc High Alarm	3.6	V	
146-147	2	Vcc Low Alarm	3.0	V	
148-149	2	Vcc High Warning	3.5	V	
150-151	2	Vcc Low Warning	3.1	V	
152-159	8	Reserved	Reserved		
160-175	16	Vendor Specific			
176-177	2	RX Power High Alarm	3.3	dBm	
178-179	2	RX Power Low Alarm	-12.5	dBm	
180-181	2	RX Power High Warning	2.3	dBm	
182-183	2	RX Power Low Warning	-11.5	dBm	
184-185	2	Tx Bias High Alarm	75	mA	
186-187	2	Tx Bias Low Alarm	10	mA	



188-189	2	Tx Bias High Warning	70	mA	
190-191	2	Tx Bias Low Warning	15	mA	
192-199	8	Resrved thresholds for channel parameter set 3			
200-207	8	Resrved thresholds for channel parameter set 3			
208-223	16	Vendor Specific			

## Package Outline

Dimensions are in millimeters. (unit: mm)



## Ordering information

Part. No	Pack	Specifications							
		Rate* (Gbps)	Po (dBm)	RX	Sen* (dBm)	Temp (°C)	Reach (km)	Pull tap Color	DDM
MQA4Z10-D0C-T1	QSFP+	10.3125	-7~2.3	PIN	<-11.5	0~70	10	Blue	Y

\*Note:For each channel.