
MQBG102-D0C-T1

Features

- ◆ Compliant with CWDM4 MSA
- ◆ Supports 103.1Gb/s aggregate bit rate
- ◆ Integrated 4 CWDM lanes MUX/DEMUX
- ◆ Up to 2km transmission on single mode fiber (SMF) with FEC
- ◆ 4x25G electrical interface (OIF CEI-28G-VSR)
- ◆ Duplex LC receptacles
- ◆ Hot pluggable QSFP28 form factor
- ◆ Maximum power consumption 3.5W
- ◆ Operating temperature range: 0°C~+70°C
- ◆ RoHS Compliant
- ◆ DDMI function available with internally calibrated mode
- ◆ I2C management interface

Application

- ◆ Data Center Interconnect
- ◆ 100G CWDM4 applications with FEC
- ◆ Infiniband QDR and DDR interconnects
- ◆ Enterprise networking

Standard

- ◆ Compliant with QSFP28 MSA, CWDM4 MSA
- ◆ Compliant with SFF-8636
- ◆ RoHS Compliant

General Description

Mentech 100G QSFP28 CWDM4 integrates four transmitters and receivers into one module. 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 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 QSFP28 Multi-Source Agreement (MSA) and compliant to CWDM4 MSA. Host FEC is required to support up to 2km fiber transmission.

Specification

Absolute Maximum Ratings				
Parameter	Symbol	Min	Max	Unit
Storage temperature	TS	-40	85	°C
Power Supply Voltage	Vcc	-0.5	+4	V
Relative Humidity	RH	5	95	%

Recommended Operating Conditions					
Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	Tc	0		70	°C
Power Supply Voltage	Vcc	3.13	3.3	3.47	V
Supply Current	Icc			1.12	A
Each Channel Data Rate	BR		25.78125		Gbps
SMF per G.652	Lmax	-	-	2	km

Electrical transmitter Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Signaling rate per lane		25.78125 ± 100 ppm			GBd	
Differential data input swing per lane				900	mV	
Differential termination mismatch				10	%	
Eye width			0.46		UI	
Eye height			95		mV	
DC common mode voltage		-350		2850	mV	

Electrical receiver Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Signaling rate per lane		25.78125 ± 100 ppm			GBd	
Differential data input swing per lane				900	mV	
Differential termination mismatch				10	%	
Eye width		0.57			UI	
Transition time, 20% to 80%	Tris/Tfall	12			ps	

Optical Transmitter Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Lane center wavelengths(range)		1264.5	1271	1277.5	nm	
		1284.5	1291	1297.5		
		1304.5	1311	1317.5		
		1324.5	1331	1337.5		
Total Average Launch Power	Pout			10.5	dBm	
Average Launch Power per Lane	TXPx	-6.5		2.5	dBm	
Extinction Ratio	ER	3.5			dB	
Sidemode Suppression ratio	SMSR	30			dB	
Relative Intensity Noise	RIN			-130	dB/Hz	
Transmitter Reflectance				-12	dB	
Transmitter Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3}		{0.31, 0.4, 0.45, 0.34, 0.38, 0.4}				1
Optical receiver Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Lane center wavelengths(range)		1264.5	1271	1277.5	nm	
		1284.5	1291	1297.5		
		1304.5	1311	1317.5		
		1324.5	1331	1337.5		
Receive Saturation (OMA) per Lane	Rmax	2.5				
Unstressed Receiver Sensitivity (OMA) per Lane	Rxsens			-10	dBm	1, 2, 3

Receiver Reflectance					-26	dB	
LOS	Optical De-assert	Pd			-11.6	dBm	
	Optical Assert	Pa	-24		-13.6		
LOS hysteresis			0.5			dB	

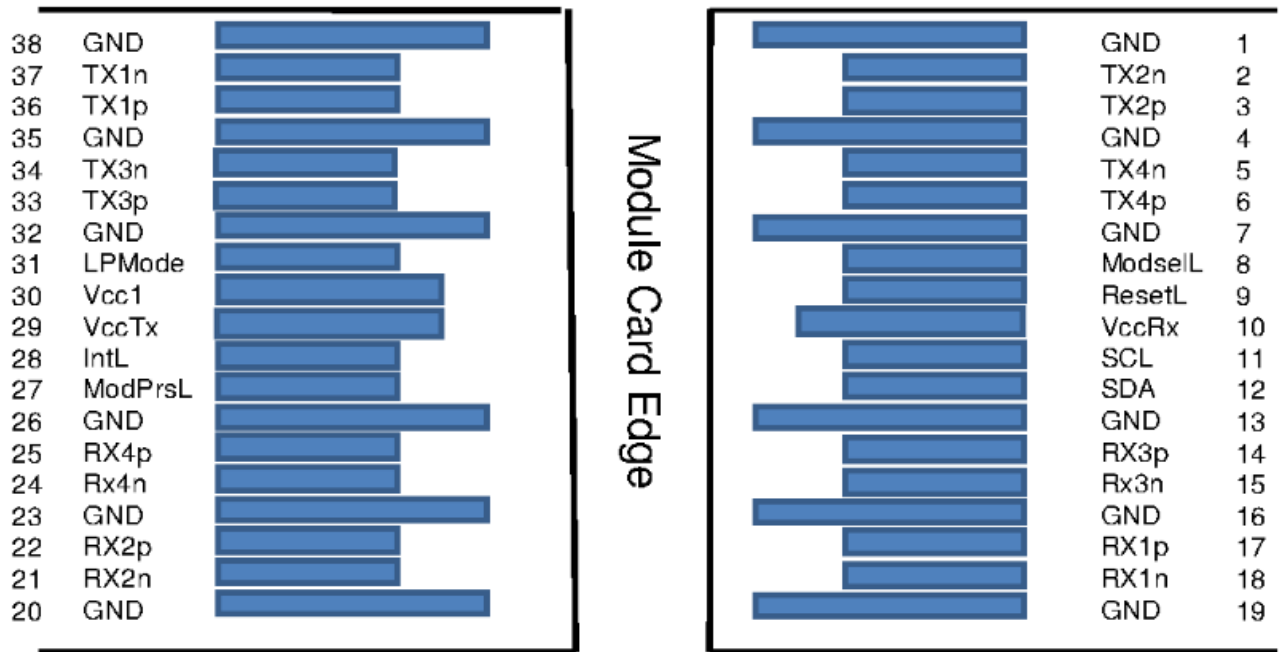
Note1. Hit ratio 5E-5.

Note2. Measured with a PRBS 2³¹-1 test pattern, @25.78Gb/s, BER<5E-5, for each channel.

Note3. Minimum value is informative, equals min Tx OMA with infinite ER and max channel insertion loss.

Note4. Power value and power accuracy are with all channels on

Pin Description



Top Side
Viewed From Top

Bottom Side
Viewed From Bottom

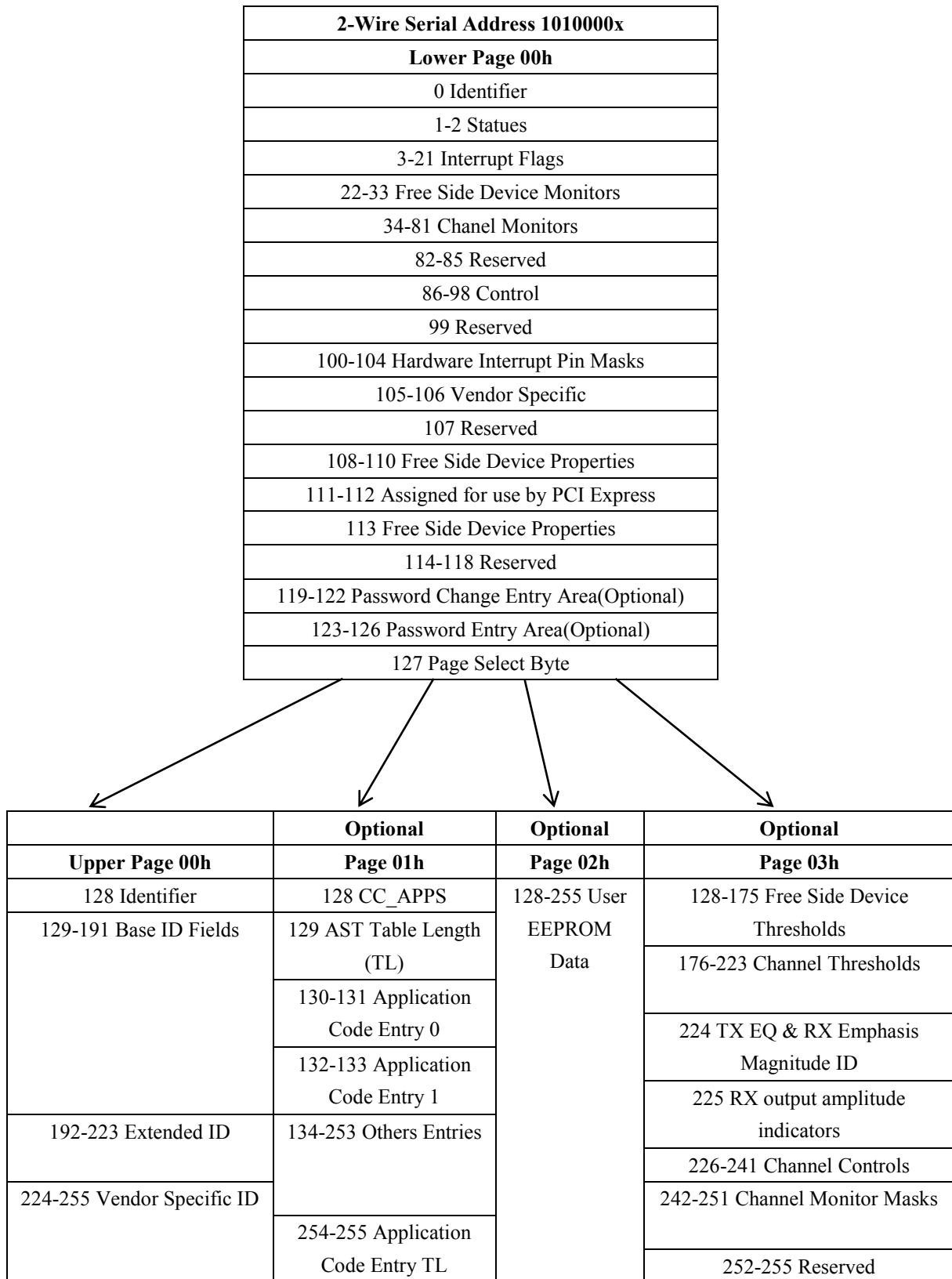
As Viewed Through Top of Board

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.	1
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.	1
30	Vcc1	3.3V power supply.	1
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.	

Note1. VccRx, Vcc1 and VccTx are the receiving and transmission power suppliers and shall be applied concurrently. Recommended host board power supply filtering is shown below. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the QSFP28 transceiver module in any combination.

Memory map



QSFP28 Memory Map

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

Address	Name of field	Hex	Description
BASE ID Fields			
128	Identifier	11	QSFP28 transceiver
129	Ext. Identifier	CC	Extend Identifier of free side device
130	Connector Type	07	LC (Lucent Connector)
131-138	Specification Compliance	80 00 00 00 00 00 00 00	Code for electronic or optical compatibility
139	Encoding	07	Code for serial encoding algorithm
140	BR, nominal	FF	Nominal bit rate per channel, units of 100Mbps
141	Extended Rate Select Compliance	00	Tags for extended rate select compliance
142	Length(SMF)	02	Transceiver link length support for different fibers
143	Length(OM3 50um)	00	
144	Length(OM2 50um)	00	
145	Length(OM1 62.5um)	00	
146	Length(passive copper or active cable or OM4 50um))	00	
147	Device technology	40	Device technology
148-163	Vendor name	4D 45 4E 54 45 43 48 4F 50 54 4F 20 20 20 20 20	“MENTECHOPTO”(ASCII character)
164	Extended Module	00	Extended Module
165-167	Vendor OUI	00 00 00	Free side device vendor IEEE company ID
168-183	Vendor PN	4D 51 42 47 31 30 32 2D 44 30 43 2D 54 31 20 20	“MQBG102-D0C-T1”(ASCII character)
184-185	Vendor rev	41 30	“A0”(ASCII character)
186-187	Wavelength or Copper Cable Attenuation	65 A4	Nominal laser wavelength
188-189	Wavelength tolerance or Copper Cable Attenuation	05 14	Guaranteed range of laser wavelength from nominal wavelength
190	Max case temp.	00	Maximum case temperature in degrees C.
191	CC_BASE	xx	Check code for base ID fields
Extended ID Fields			
192	Link codes	06	100G CWDM4

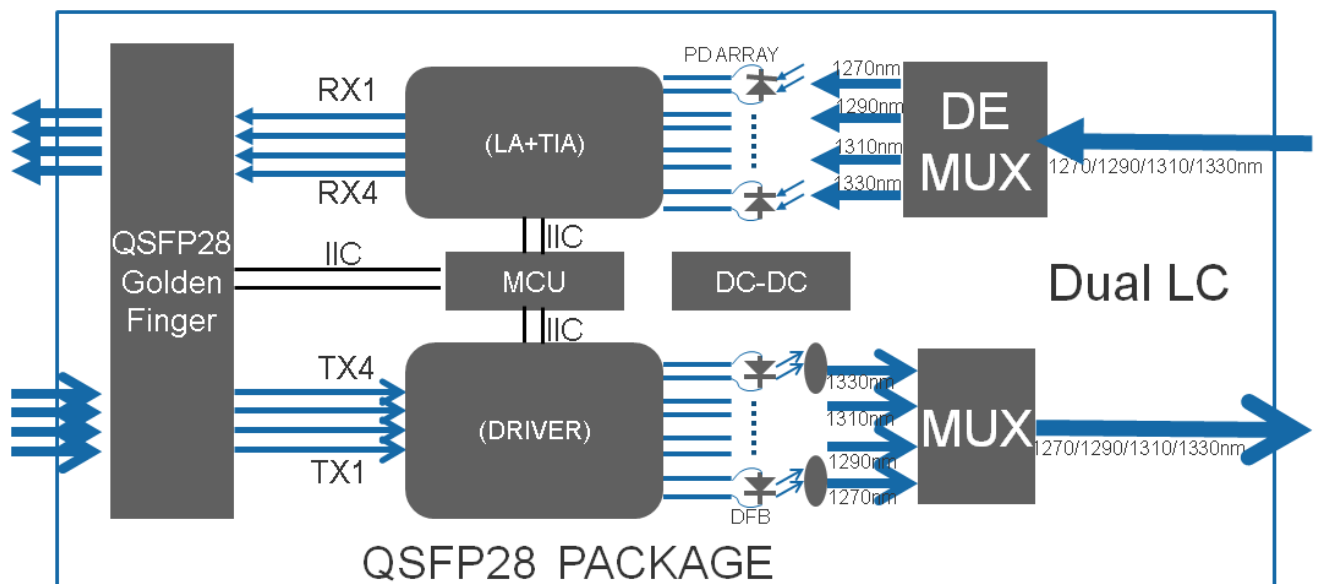
193-195	Options	07 f0 60	EQ、RX Ampli、Rx Emph、Tx Equa、Tx_Equa Auto、TX/RX CDR ON/IFF、Tx Sque OMA
196-211	Vendor SN	xx.....xx	Serial number provided by vendor(ASCII)
212-219	Date Code	xx.....xx	Vendor's manufacturing date code
220	Diagnostic Monitoring Type	0C	Indicates which type of diagnostic monitoring is implemented
221	Enhanced Options	0C	Indicates which optional enhanced features are implemented in the free side device
222	BR, nominal	67	Nominal bit rate per channel, units of 250 Mbps.
223	CC-EXT	xx	Check code for the Extended ID Fields
Vendor Specific ID Field			
224-255	Vendor Specific	00	Vendor specific EEPROM

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	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	3.5	dBm	
178-179	2	RX Power Low Alarm	-12.5	dBm	
180-181	2	RX Power High Warning	2.5	dBm	
182-183	2	RX Power Low Warning	-10.5	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	

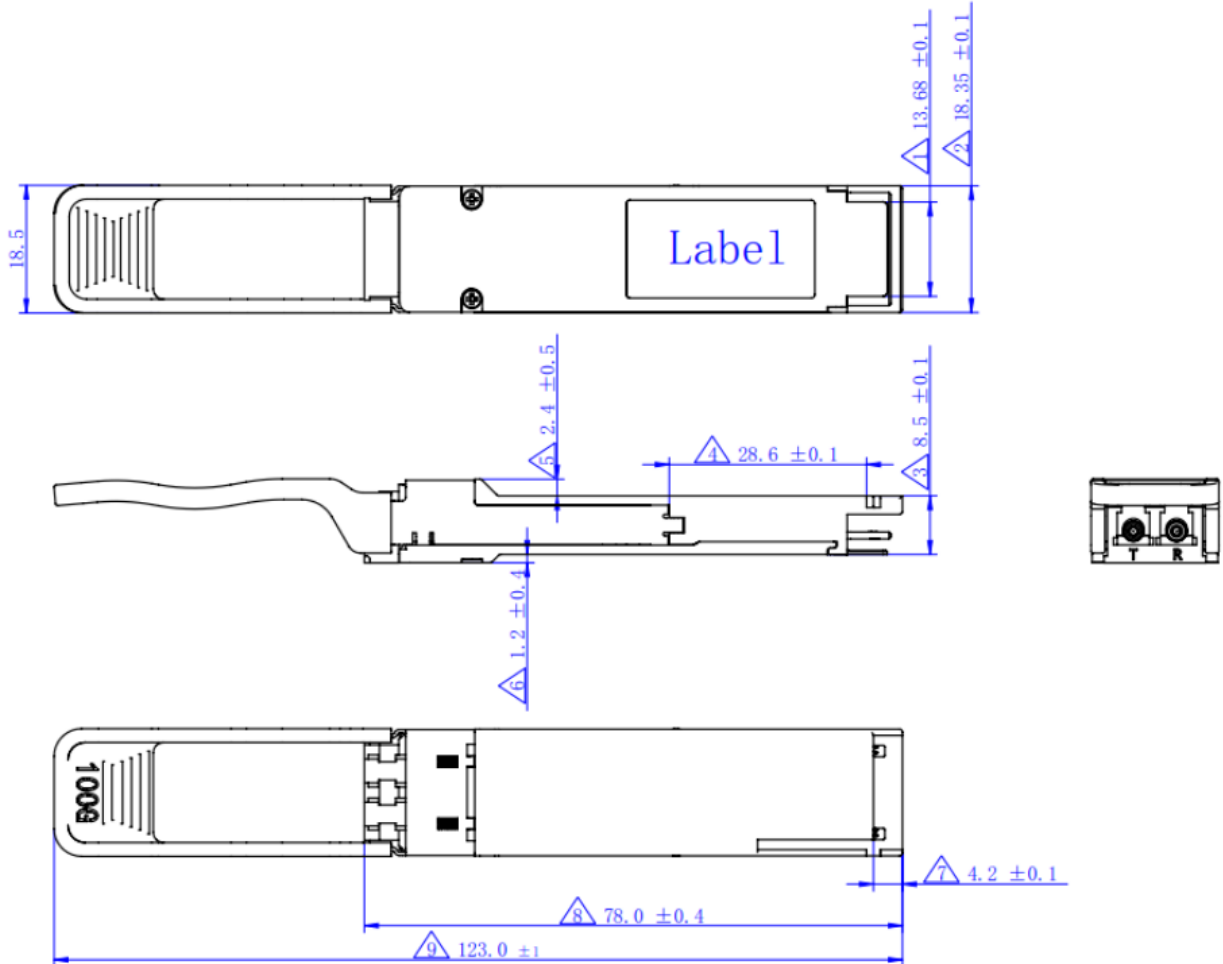
192-193	2	Tx Power High Alarm	3.5	dBm	
194-195	2	Tx Power Low Alarm	-7.5	dBm	
196-197	2	Tx Power High Warning	2.5	dBm	
198-199	2	Tx Power Low Warning	-6.5	dBm	
200-207	8	Reserved			
208-215	8	Reserved			
216-223	8	Vendor Specific			

Optical Module Block Diagram



Package Outline

Dimensions are in millimeters. (Unit: mm)



Ordering information

Part. No	Pack	Specifications							
		Rate* (Gbps)	Po (dBm)	RX	OMA Sen* (dBm)	Temp (°C)	Reach (km)	Pull tap Color	DDM
MQBG102-D0C-T1	QSFP28	25.78125	-6.5~2.5	PIN	<-10	0~70	2	Green	Y

*:For each channel.