PRODUCT SPECIFICATION

Part No.:	AC-QPBL-LWDM1G100-80/ AC-QPBL-LWDM2G100-80	
Description:	100G QSFP28 Transceiver, BIDI ZR4 LWDM1 80KM 100G QSFP28 Transceiver, BIDI ZR4 LWDM2 80KM	
Release Date	Rev.	Revision Change Description
2023/06/07	A0	New Release
2024/12/28	A1	Template Update

Features

- Support line rates from 103.125 Gb/s to 112.2 Gb/s OTU4
- Built-in 4-channel Clock and Data Recovery (CDR) in TX and RX
- LAN WDM EML laser and PIN receiver with SOA
- Up to 80km reach for G.652 SMF
- Hot pluggable 38 pin electrical interface
- QSFP28 MSA compliant
- BIDI LC optical receptacle
- RoHS-10 compliant and lead-free
- Excellent EMI performance
- Single +3.3V power supply
- Maximum power consumption 5.5W
- Case operating temperature
  Commercial: 0 ~ 70°C
  Industrial: -40 ~ +85°C

Application

- 100GBASE-ZR4 Ethernet Links
- Infiniband QDR and DDR interconnects
- Telecom networking

I. Absolute Maximum Ratings

It has to be noted that the operation in excess of any individual absolute maximum ratings might cause permanent damage to this module.

Parameter	Symbol	Min	Max	Unit	Notes
Storage Temperature	Ts	-40	+85	°C	-
Supply Voltage	Vcc	-0.3	4.0	V	-
Relative Humidity	RH	15	85	%	-
Damage Threshold	THd	6.5	-	dBm	-

II. Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case temperature	T_{OP}	0	-	70	ºC	Commercial
		-40	-	85	ºC	Industrial
Supply Voltage	Vcc	3.135	3.3	3.465	V	-
Data Rate Per Lane	-	-	25.78125	28.05	Gb/s	-
Control Input Voltage High	-	2	-	Vcc	V	-
Control Input Voltage Low	-	0	-	0.8	V	-
Link Distance (SMF)	D	-	-	80	KM	-

Notes:

1.Depending on actual fiber loss/km (link distance specified is for fiber insertion loss of 0.35dB/km)

III. General Description

Lonte's AC-QPBL-LWDM1G100-80/ AC-QPBL-LWDM2G100-80 is designed for 80km optical communication applications. This module contains 4-lane optical transmitter, 4-lane optical receiver and module management block including 2 wire serial inter-face. The optical signals are multiplexed to a single-mode fiber through an industry standard LC connector.

IV. Pin Assignment and Pin Description

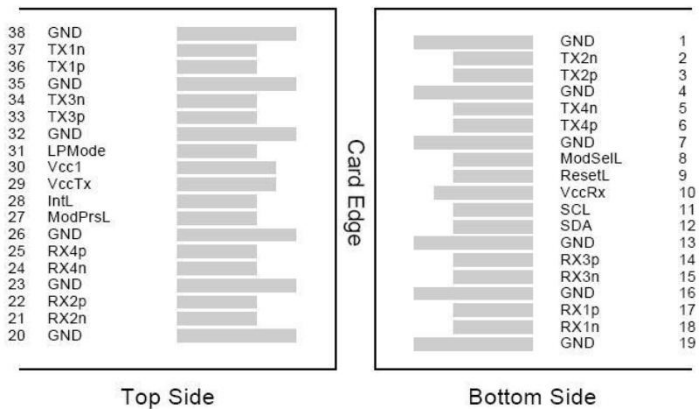


Figure1. Diagram of host board connector block pin numbers and names

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 output	
4	GND	Transmitter Ground (Common with Receiver Ground)	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data output	
7	GND	Transmitter Ground (Common with Receiver Ground)	1
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	VccRx	3.3V Power Supply Receiver	2
11	SCL	2-Wire serial Interface Clock	
12	SDA	2-Wire serial Interface Data	
13	GND	Transmitter Ground (Common with Receiver Ground)	
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Transmitter Ground (Common with Receiver Ground)	1
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Transmitter Ground (Common with Receiver Ground)	1
20	GND	Transmitter Ground (Common with Receiver Ground)	1
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Transmitter Ground (Common with Receiver Ground)	1
24	Rx4n	Receiver Inverted Data Output	1
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Transmitter Ground (Common with Receiver Ground)	1
27	ModPrsl	Module Present	
28	IntL	Interrupt	
29	VccTx	3.3V power supply transmitter	2
30	Vcc1	3.3V power supply	2
31	LPMode	Low Power Mode	
32	GND	Transmitter Ground (Common with Receiver Ground)	1
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Output	
35	GND	Transmitter Ground (Common with Receiver Ground)	1
36	Tx1p	Transmitter Non-Inverted Data Input	

37	TX1N	Transmitter Inverted Data Output	
38	GND	Transmitter Ground (Common with Receiver Ground)	1

Notes：

1.GND is the symbol for signal and supply (power) common for QSFP28 modules. All are common within the QSFP28 module and all module voltages are referenced to this potential unless otherwise noted. 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. 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. The connector pins are each rated for a maximum current of 1000mA.

V. Electrical Characteristics

The following electrical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Power Consumption	P	-	-	+5.5	W	-
Supply Current	I_{cc}	-	-	1585	mA	-
Transmitter (Each Lane)						
Input Differential Impedance	Z_{in}	90	100	110	Ω	-
Differential Termination Mismatch	-	-	-	10	%	-
Differential Data Input Amplitude	Vin, PP	180	-	1000	mV	-
LPMode, Reset and ModSelL	V_{IL}	-0.3	-	0.8	V	-
	V_{IH}	2	-	Vcc+0.3	V	-
Receiver						
Differential Data Output Amplitude	Vout, PP	350	-	900	mV	-
Differential Termination Mismatch	-	-	-	10	%	-
Transition Time, 20 to 80%	-	9.5	-	-	ps	-
ModPrsL and IntL	VOL	0	-	0.4	V	-
	VOH	Vcc-0.5	-	Vcc+0.3	V	-

VI. Optical Characteristics

The following optical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min	Typical	Max	Unit	Notes

Transmitter						
Lane wavelength (range)	L0	1272.55	1273.55	1274.54	nm	LWDM1
	L1	1276.89	1277.89	1278.89	nm	
	L2	1281.25	1282.26	1283.27	nm	
	L3	1285.65	1286.66	1287.68	nm	
	L4	1294.53	1295.56	1296.59	nm	LWDM2
	L5	1299.02	1300.05	1301.09	nm	
	L6	1303.54	1304.58	1305.63	nm	
	L7	1308.09	1309.14	1310.09	nm	
Signaling rate, each lane	-	-	25.78125	28.05	Gb/s	-
Side-mode suppression ratio	SMSR	30	-	-	-	-
Total launch power	P_T	8.0	-	10.5	dBm	-
Average launch power,	Pavg	1.0	-	6.5		-
Extinction Ratio	ER	6.0	-	-	dB	-
Difference in Launch Power between any Two	Ptx,diff	-	-	3.6	dB	-
Average launch power of OFF transmitter, each lane	Poff	-	-	-30	dBm	-
Transmitter reflectance	R_T	-	-	-12	dB	-
RIN20OMA	R_{IN}	-	-	-130	dB/Hz	-
Optical Return Loss Tolerance	TOL	-	-	20	dB	-
Transmitter eye mask {X1, X2, X3, Y1, Y2,	-	{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}			-	-
Receiver						
Lane wavelength (range)	L0	1272.55	1273.55	1274.54	nm	LWDM1
	L1	1276.89	1277.89	1278.89	nm	
	L2	1281.25	1282.26	1283.27	nm	
	L3	1285.65	1286.66	1287.68	nm	
	L4	1294.53	1295.56	1296.59	nm	LWDM2
	L5	1299.02	1300.05	1301.09	nm	
	L6	1303.54	1304.58	1305.63	nm	
	L7	1308.09	1309.14	1310.09	nm	
Signaling rate, each lane	-	-	25.78125	28.05	Gb/s	-
Average Receive Power, each Lane	-	-30	-	-7	dBm	-
Receive Power (OMA), each Lane	-	-	-	-7	dBm	-
Receiver reflectance	-	-	-	-26	dB	-
Receiver sensitivity Average, each lane	SEN1	-	-	-22	dBm	1
	SEN2	-	-	-21	dBm	2
	SEN3	-	-	-26	dBm	3
	SEN4	-	-	-25	dBm	4
LOS Assert	LOSA	-40	-	-	dBm	-
LOS Deassert	LOSD	-	-	-29	dBm	-
LOS Hysteresis	LOSH	0.5	-	-	dB	-

Notes:

1.Measured @25.78125Gbps, ER=8.2dB, BER=<1E-12, PRBS=2^{31}-1 NRZ

2.Measured @28.05Gbps, ER=8.2dB, BER=<1E-12, PRBS=2^{31}-1 NRZ

3.Measured @25.78125Gbps, ER=8.2dB, BER=<5E-5, PRBS=2^{31}-1 NRZ

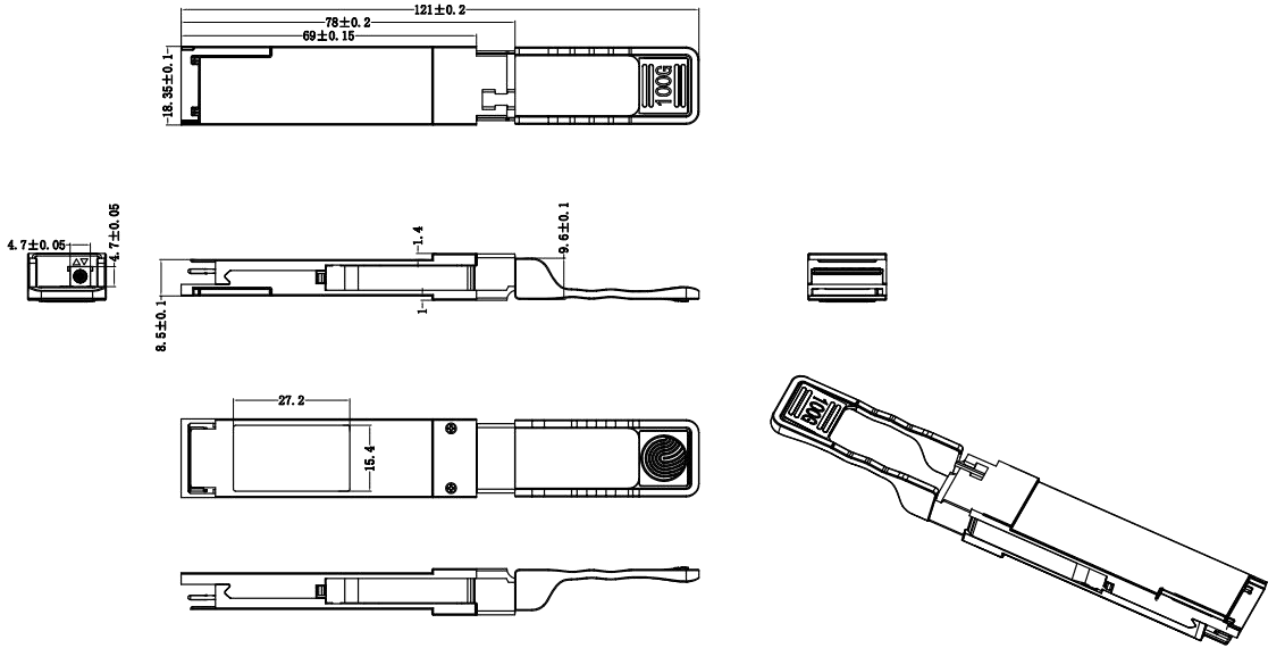
4.Measured @28.05Gbps, ER=8.2dB, BER=<5E-5, PRBS=2^{31}-1 NRZ

VII. Digital Diagnostic Functions

The following digital diagnostic characteristics are defined over the normal operating conditions unless otherwise specified.

Parameter	Symbol	Min	Max	Unit	Range
Temperature monitor absolute error	DMI_ Temp	-3	3	℃	-40~85℃
Supply voltage monitor absolute error	DMI _V_{CC}	-3	3	%	0~V_{cc}
RX power monitor absolute error	DMI_RX	-3	3	dB	-7~-30dBm
Bias current monitor error	DMI_ bias	-10	10	%	0~120mA
TX power monitor absolute error	DMI_TX	-3	3	dB	2~4.5dBm

VIII. Mechanical Dimensions



Ordering information

Part Number	Data Rate (Gb/s)	Wavelength (nm)	Reach (km)	Temp (℃)
AC-QPBL-LWDM1G100-80	103.1/112	LWDM1：1273.55, 1277.89, 1282.26, 1286.66 LWDM2： 1295.56, 1300.05, 1304.58, 1309.14	80	0~70
AC-QPBL-LWDM2G100-80	103.1/112		80	0~70
AC-QPBL-LWDM1G100-80F	103.1/112		80	-40~85
AC-QPBL-LWDM2G100-80F	103.1/112		80	-40~85