PRODUCT SPECIFICATION

Part No.:	AC-QPBL-49G100-40/ AC-QPBL-94G100-40	
Description:	100G QSFP28 Transceiver, BIDI TX1304nm/RX1309nm 40km 100G QSFP28 Transceiver, BIDI TX1309nm/RX1304nm 40km	
Release Date	**Rev.**	**Revision Change Description**
2023/06/07	A0	New Release
2024/12/28	A1	Template Update

Features

- ✧ Lane signaling rate 106.25Gb/s with PAM4
- ✧ 4x25.78Gb/s with NRZ electrical interface (CAUI-4)
- ✧ Up to 40km transmission over G.652 SMF
- ✧ Hot-pluggable QSFP28 form factor with 38-pin connector
- ✧ BIDI LC optical receptacle
- ✧ RoHS-10 compliant and lead-free
- ✧ Excellent EMI performance
- ✧ Single +3.3V power supply
- ✧ Maximum power consumption 4.5W
- ✧ Operating case temperature range:
  Commercial: 0 ~ 70℃
  Industrial: -40 ~ +85℃

Application

- ✧ 100GBASE-ER-BiDi Ethernet Links
- ✧ 100G metro and access
- ✧ High-speed links for telecommunications transport equipment

Standard

- ✧ QSFP28 MSA
- ✧ SFF-8636

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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		Gb/s	-
Control Input Voltage High	-	2	-	Vcc	V	-
Control Input Voltage Low	-	0	-	0.8	V	-
Link Distance (SMF)	D	-	-	40	KM	-

III.General Description

Lonte' AC-QPBL-49G100-40/ AC-QPBL-94G100-40 is designed for 40km 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. A block diagram is shown in Figure 1.

IV.Pin Assignment and Pin Description

Table 1: QSFP28 Module PIN Definition

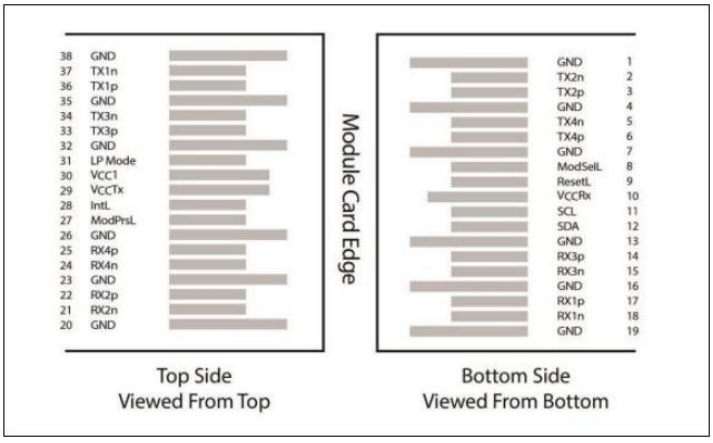


Figure 2. QSFP28 Connector Pad layout

Pin	Symbol	Name/Description	Notes
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 Inverted Data Output	-
22	Rx2p	Receiver Non-Inverted Data Output	-
23	GND	Ground	-
24	Rx4n	Receiver Inverted Data Output	-
25	Rx4p	Receiver Non-Inverted Data Output	-
26	GND	Ground	-
27	ModPrsL	Module Present	-
28	IntL	Interrupt	-
29	VccTx	+3.3 V Power Supply transmitter	-
30	Vcc1	+3.3 V Power Supply	-
31	LPMode	Low Power Mode	-
32	GND	Ground	-
33	Tx3p	Transmitter Non-Inverted Data Input	-
34	Tx3n	Transmitter Inverted Data Input	-
35	GND	Ground	-
36	Tx1p	Transmitter Non-Inverted Data Input	-
37	Tx1n	Transmitter Inverted Data Input	-
38	GND	Ground	-

VI.Optical Characteristics

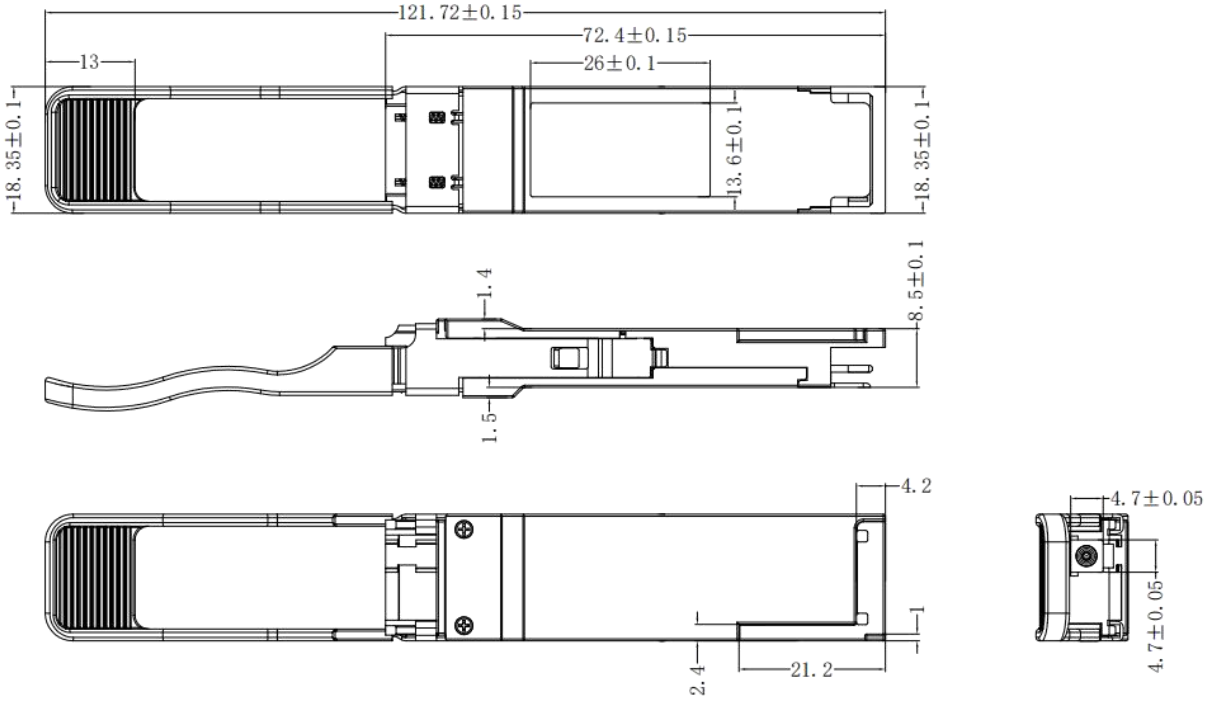
The following electrical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Optical Transmitter Characteristics						
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**	**Notes**
Tansmitter						
Data Rate (each Lane)	-	53.125±100 ppm(CAUI-4)			GBd	-
Modulation Format	-	PAM4			-	-
Wavelength	UP-LINK	1304.58+/- 1.0			nm	-
	DOWN-LINK	1309. 14+/- 1.0			-	-
Side-mode Suppression ratio	SMSR	30	-	-	dB	-
Average launch power1	PAVG	1.7	-	7.1	dBm	-
Outer Optical Modulation Amplitude (OMAouter) TDECQ<1.4dB TDECQ>1.4dB	POMA	4.7 3.3+TDECQ	-	7.9	dBm	-
Transmitter and Dispersion penalty2	TDECQ	-	-	3.9	dB	-
TECQ	TECQ	-	-	3.9	dB	-
|TDECQ-TECQ| (max)	-	-	-	2.7	dB	-
Extinction Ratio	-	5.0	-	-	dB	-
Optical Return Loss Tolerance	-	-	-	15	dB	-
Transmitter Reflectance3	RL	-	-	-26	dB	-
Average Launch Power OFF Transmitter	Poff	-	-	- 15	dBm	-
RIN15.6 OMA	RIN	-	-	- 136	dB/Hz	-
Transmitter (Each Lane)						
Signaling rate	Rate	25.78 (CAUI-4)			Gbps	-
Differential Input Impedance	Zd	-	100	-	Ω	-
Differential Input Voltage per lane	-	-	-	900	mV	-
Input impedance mismatch	-	-	-	10	%	-
Input High Voltage	VIH	2	-	Vcc+0.3	V	-
Input LOW Voltage	VIL	-0.3	-	0.8	V	-

Optical Receiver Characteristics						
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**	**Notes**
Data Rate (each Lane)	-	53.125 ± 100 ppm(CAUI-4)			GBd	-
Modulation Format	-	PAM4			-	-
Lane Wavelength	UP-LINK	1309.14+/-1.0			nm	-
	DOWN-LINK	1304.58+/-1.0				-
Damage Threshold3	-	-2.4	-	-	dBm	-
Average receive power4	-	-16	-	-3.4	dBm	-
Receive Power(OMAouter)	-	-	-	-2.6	dBm	-
Receiver Reflectance	-	-	-	-26	dB	-
Receiver sensitivity(OMAouter)5	-	-	-	Max(-12.7, TECQ- 15.2)	dBm	-
Stressed receiver sensitivity (OMAouter), each laned (max)6	SRS	-	-	-10	dBm	-
Transmitter Reflectance	-	-	-	-26	dB	-
LOS Assert	LOSA	-30	-	- 19.5	dBm	-
LOS De-assert	LOSD	-	-	- 15	dBm	-
LOS Hysteresis	LOSH	0.5	-	-	dB	-
Receiver (Each Lane)						
Signaling rate	Rate	25.78 (CAUI-4)			Gbps	-
Common mode voltage	Vcm	-350	-	2850	mV	-
Common Mode Noise, rms	-	-	-	17.5	mV	-
Differential Termination Resistance Mismatch (at 1 MHz)	-	-	-	10	%	-
Differential Return Loss (SDD22)	-	-	-	Per CEI-28G-VSR	dB	-
Common Mode to Differential conversion and Differential to Common Mode Conversion (SDC22,SCD22)	-	-	-	Per CEI-28G-VSR	dB	-
Common Mode Return Loss(SCC22)-from 250 MHz to 30 GHz	-	-	-	-2	-	-
Transition Time: 20/80%	-	9.5	-	-	ps	-
Vertical Eye Closure	VEC	-	-	6.5	dB	-
Eye width at 10- 15robability	EW15	0.57	-	-	UI	-
Eye height at 10-15probability	EH15	228	-	-	mV	-

VII. Mechanical Dimensions

Dimensions are in millimeters. All dimensions are ±0.2mm unless otherwise specified. (Unit: mm)



Ordering Information

Part. No	Specifications								
	Pack	Rate (Gbps)	Tx (nm)	Po (dBm)	RX	Sen (dBm)	Temp (℃)	Reach (KM)	DDM
AC-QPBL-49G100-40	QSFP28	100G	EML 1304/1309nm	1.7~7.1	APD	<-12.7	0~70	40	Y
AC-QPBL-94G100-40	QSFP28	100G	EML 1309/1304nm	1.7~7.1	APD	<-12.7	0~70	40	Y
AC-QPBL-49G100-40F	QSFP28	100G	EML 1304/1309nm	1.7~7.1	APD	<-12.7	-40~85	40	Y
AC-QPBL-94G100-40F	QSFP28	100G	EML 1309/1304nm	1.7~7.1	APD	<-12.7	-40~85	40	Y