

LPBQLE31-K40C

QSFP28 100Gb/s ER4 40km DDMI

PRODUCT FEATURES

- QSFP28 MSA compliant
- Hot pluggable 38 pin electrical interface
- 4 LAN-WDM lanes MUX/DEMUX design
- 4x25G electrical interface
- Maximum power consumption <5W
- LC duplex connector
- Supports 103.125Gb/s aggregate bit rate
- Up to 40km transmission on single mode fiber
- Operating case temperature: 0°C to 70°C
- Single 3.3V power supply
- RoHS 2.0 compliant

APPLICATIONS

- 100GE Ethernet
- OTN OTU4 4L1-9C1F
- Telecom networking
- Data Center Interconnect

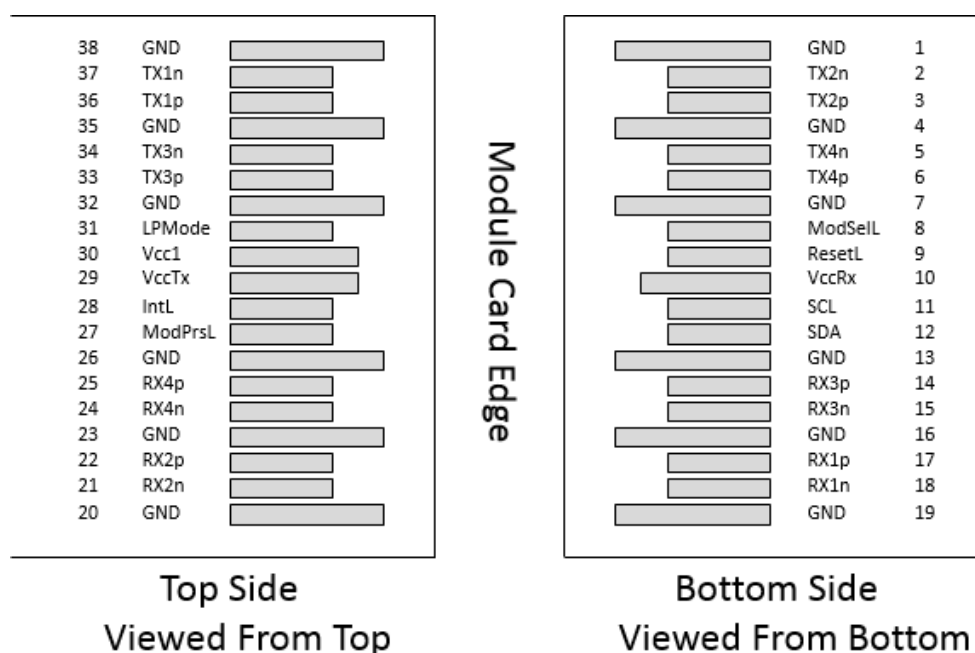
COMPLIANCE

- QSFP28 MSA
- SFF-8665
- IEEE802.3
- ROHS

Ordering information

Package	Product part NO.	Data Rate (Gbps)	Media	Wavelength (nm)	Transmission Distance(km)	Temperature Range (°C)	
QSFP28	LPBQLE31-K40C	4X25	Single-mode fiber	1294.53 ~ 1296.59 1299.02 ~ 1301.09 1303.54 ~ 1305.63 1308.09 ~ 1310.19	40	0~70	Commercial

I. Pin Diagram



MSA compliant Connector

II. Pin Descriptions

Pin	Symbol	Description	Notes
1	GND	Ground	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	1
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	Vcc Rx	+3.3V Power Supply Receiver	

11	SCL	2-wire serial interface clock	
12	SDA	2-wire serial interface data	
13	GND	Ground	1
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	1
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Ground	1
20	GND	Ground	1
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	1
24	Rx4n	Receiver Non-Inverted Data Output	
25	Rx4p	Receiver Inverted Data Output	
26	GND	Ground	1
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	Vcc Tx	+3.3V Power supply transmitter	
30	Vcc1	+3.3V Power supply	
31	LPMode	Low Power Mode	
32	GND	Ground	1
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	1
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	1

Notes:

- 1.Circuit ground is internally isolated from chassis ground.

III. 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	Typ	Max	Unit	Notes
Maximum Supply Voltage	Vcc	0		3.6	V	
Storage Temperature	Ts	-40		85	°C	
Relative Humidity	RH	5		85	%	1
Damage Threshold, each lane	THd	5.5			dBm	

Notes:

1. Non-condensing.

IV. Electrical Characteristics (EOT,TOP=0 to+70℃, VCC=3.135 to 3.465 Volts)

Parameter	Symbol	Min	Typ	Max	Unit	Note
Transmitter						
Power dissipation				5	W	
Supply Current	Icc			1.4430	A	Steady state
Data Rate, each lane			25.78125		Gbps	1
Differential Voltage pk-pk	Vpp			900	mV	At 1 MHz
Common Mode Voltage	Vcm	-350		2850	mV	
Transition time	Trise/Tfall	10			ps	20%~80%
Differential Termination Resistance Mismatch				10	%	
Eye width	EW15	0.46			UI	
Eye height	EH15	95			mV	
Receiver						
Data Rate, each lane			25.78125		Gbps	1
Differential Termination Resistance Mismatch				10	%	At 1 MHz
Differential output voltage swing	Vout, pp			900	mV	
Common Mode Noise, RMS	Vrms			17.5	mV	
Transition time	Trise/Tfall	12			ps	20%~80%
Eye width	EW15	0.57			UI	
Eye height	EH15	228			mV	

Notes:

1. For use of 100GBASE-ER4.

V. Optical Characteristics

100GBASE-ER4 Operation (EOL, TOP = 0 to +70 °C , VCC = 3.135 to 3.465 Volts)

Parameters	Unit	min	type	max	Note
Transmitter					
Signaling Speed per Lane	Gb/s	25.78125 ± 100 ppm			
Transmit wavelengths	nm	1294.53		1296.59	
		1299.02		1301.09	
		1303.54		1305.63	
		1308.09		1310.19	
Side-Mode Suppression Ratio (SMSR)	dB	30			
Total Average Launch Power	dBm			8.9	
Average launch power, each lane	dBm	-2.9		2.9	
Optical Modulation Amplitude (OMA), each lane	dBm	0.1		4.5	
Difference in launch power between any two lanes(Average and OMA)	dB			3.6	
Transmitter and Dispersion Penalty (TDP), each lane	dB			2.5	
Extinction Ratio (ER)	dB	8			
RIN20OMA	dB/Hz			-130	
Optical return loss tolerance	dB			20	
Transmitter reflectance	dB			-12	
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3}		{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}			1
Mask margin	%	5			1
Receiver					
Signaling Speed per Lane	Gb/s	25.78125 ± 100 ppm			
Receive wavelengths	nm	1294.53		1296.59	
		1299.02		1301.09	
		1303.54		1305.63	

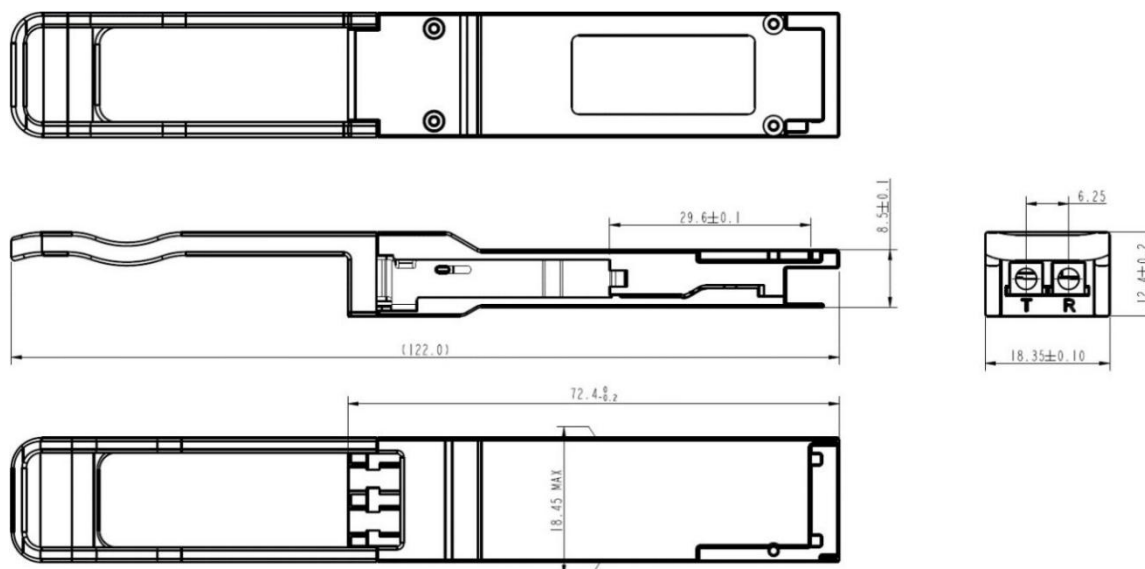
		1308.09		1310.19	
Damage threshold, each lane	dBm	5.5			
Average receiver power, each lane	dBm	-20.9		-3.5	
Receiver power, each lane(OMA)	dBm			-3.5	
Difference in receive power between any two lanes (Average and OMA)				4.5	
Receiver reflectance	dB			-26	
Receiver sensitivity (AOP), each lane	dBm			-20.9	2
Receiver 3 dB electrical upper cutoff frequency, each lane	GHz			31	
LOS Assert	dBm	-33			
LOS De-Assert	dBm			-22	
LOS Hysteresis	dB	0.5			

Notes:

1.Hit ratio 5×10^{-5} .

2.Sensitivity is specified at BER@1E-12 without FEC.

VI. Mechanical Specifications



Mechanical Dimensions