

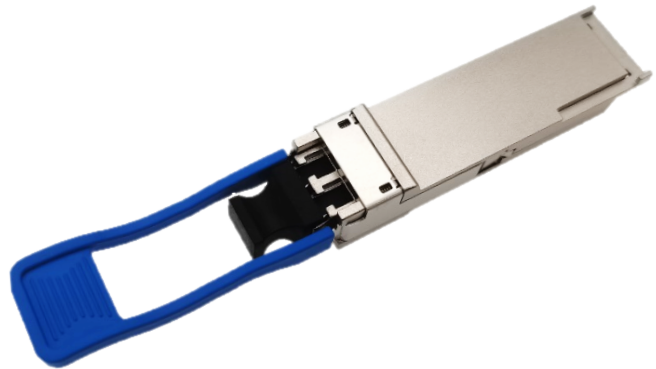
LPBQLB31-K10C

QSFP28 100Gb/s LR4 10km DDM

PRODUCT FEATURES

- Supports 103.1Gb/s aggregate bit rate
- 4x25Gb/s retimed electrical interface
- 4X25Gb/s DFB-based LAN-WDM transmitter and PIN/TIA receiver
- Maximum link length of 10km on Single Mode Fiber (SMF)
- Hot-pluggable QSFP28 footprint
- Duplex LC receptacles
- Single 3.3V power supply
- Maximum power dissipation < 4.5W
- RoHS-6 compliant and lead-free
- I²C management interface
- Case operating temperature

Commercial: 0°C to +70°C



APPLICATIONS

- 100GBASE-LR4 100G Ethernet

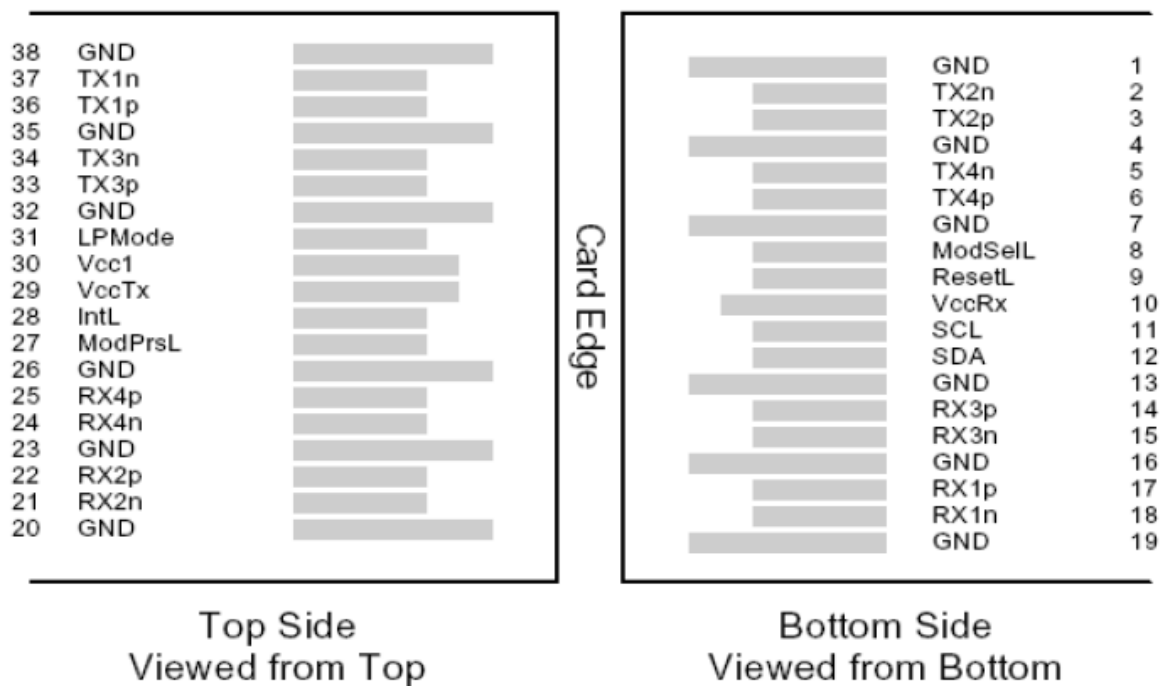
Compliance

- QSFP28 MSA.
- IEEE802.3bm and IEEE802.3ba
- SFF-8636
- RoHS

Ordering information

Part No.	Bit Rate (Gbps)	Laser (nm)	Distance	Fiber Type	DDMI	Connector	Temp
LPBQLB31-K10C	4*25.78125	LWDM	10km	SMF	YES	LC	0℃~+70℃

I. Pin Diagram



QSFP28-compliant 38-pin connector (per SFF-8679)

II. Pin Descriptions

Pin	Symbol	Name/Description	Ref.
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	ModSe1L	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 Inverted Data Output	
25	Rx4p	Receiver Non-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

Note:

1. Circuit ground is internally isolated from chassis ground.

III. Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Ref.
Storage Temperature	T_s	-40		85	°C	
Storage Ambient Humidity	H_A	5		95	%	
Maximum Supply Voltage	V_{CC}	-0.5		4.0	V	
Signal Input Voltage		-0.3		$V_{CC}+0.3$	V	
Receiver Damage Threshold		+5.5			dBm	
Lead Soldering Temperature/Time	T_{SOLD}			260/10	°C/sec	1
Lead Soldering Temperature/Time	T_{SOLD}			360/10	°C/sec	2

Note:

1. Suitable for wave soldering.
2. Only for soldering by iron.

IV. General Product Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Ref.
Data Rate (per line)	BR		25.78125		Gbps	
Case Operating Temperature	T_{case}	0	-	70	°C	
Power Supply Voltage	V_{CC}	3.13	3.3	3.47	V	
Transmission Distance	TD		-	10	km	
Coupled fiber	Single mode fiber					9/125um SMF

V. Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Ref.
Transmitter(per lane)						
Total Average Output Power	P_{OUT}			10.5	dBm	
Average Launch Power per lane	TXPx	-4.3		4.5	dBm	
Transmit OMA per Lane	TxOMA	-1.3		4.5	dBm	
Extinction Ratio	ER	4			dB	
Center Wavelength	λ_c		1294.53 ~ 1296.59 1299.02 ~ 1301.09 1303.54 ~ 1305.63 1308.09 ~ 1310.19		nm	
RMS Spectral Width	σ			1	nm	

Transmitter OFF Output Power	P _{Off}			-30	dBm	
Transmitter eye mask definition {X1,X2,X3,Y1,Y2,Y3}		{0.25,0.4,0.45,0.25,0.28,0.4}				1
Receiver(per lane)						
Input Optical Wavelength	λ _{IN}		1294.53 ~ 1296.59 1299.02 ~ 1301.09 1303.54 ~ 1305.63 1308.09 ~ 1310.19		nm	
Rx Sensitivity(OMA) per lane	R _{SENS}			-8.6	dBm	
Input Saturation Power (Overload)	P _{SAT}			+4.5	dBm	
Receiver Reflectance	R _{fl}			-26	dBm	
Loss of Signal Assert	P _A	-30			dBm	
Loss of Signal De-assert	P _D			-11	dBm	
LOS Hysteresis	P _D - P _A	0.5			dB	

Note:

1. Hit ratio 5×10^{-5} .

VI. Digital Diagnostic Functions

ESBQLB31-K10C QSFP28 transceivers support the I2C-based diagnostics interface specified by the QSFP28 MSA.

VII. Electrical Interface Characteristics

Parameter	Symbol	Min.	Type	Max.	Unit	Ref.
Transmitter						
Signaling rate (each lane)	SR		25.78125		Gbps	
Differential data input voltage per lane	$V_{\text{in,pp,diff}}$	-	-	900	mV	
Differential termination mismatch	-	-	-	10	%	
Single-ended voltage tolerance range	-	-0.4	-	3.3	V	
DC common mode voltage	-	-350	-	2850	mV	

Receiver						
Signaling rate (each lane)	SR		25.78125		Gbps	
Differential output voltage	-	-	-	900	mV	
Eye width	-	0.57	-	-	UI	
Eye height	-	228	-	-	mV	
Differential termination mismatch	-		-	10	%	
Transition time (min, 20% to 80%) @LR4	-	12	-	-	ps	
Transition time (min, 20% to 80%) @OTU4	-	9.5	-	-	ps	

VIII.Mechanical Specifications (Unit: mm)

compatible with SFF-8661.

