LinkPro™

LPBQLE31-K80C

QSFP28 100Gb/s ZR4 80km DDMI

PRODUCT FEATURES

- 4 lane MUX/DEMUX design
- Supports 100GBASE-ZR4 for line rate of 103.125Gb/s LAN WDM EML laser and PIN receiver with SOA
- Aggregate bandwidth of >100Gb/s
- LC duplex connector
- Up to 80km transmission on single mode fiber
- Operating case temperature: 0℃ to 70℃
- Single 3.3V power supply
- RoHS compliant part
- Supports FEC(Forward Error Correction)

APPLICATIONS

- 100GBASE-ZR4

COMPLIANCE

- QSFP28 MSA
- IEEE802.3
- ROHS

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Ordering information

Package	Product part NO.	Data Rate (Gbps)	Media	Wavelength (nm)	Transmission Distance(km)	Temperature Range（℃）	
QSFP28	LPBQLE31-K80C	4X25	Single-mode fiber	1294.53 ~ 1296.59 1299.02 ~ 1301.09 1303.54 ~ 1305.63 1308.09 ~ 1310.19	80	0~70	Commercial

I. Pin Diagram

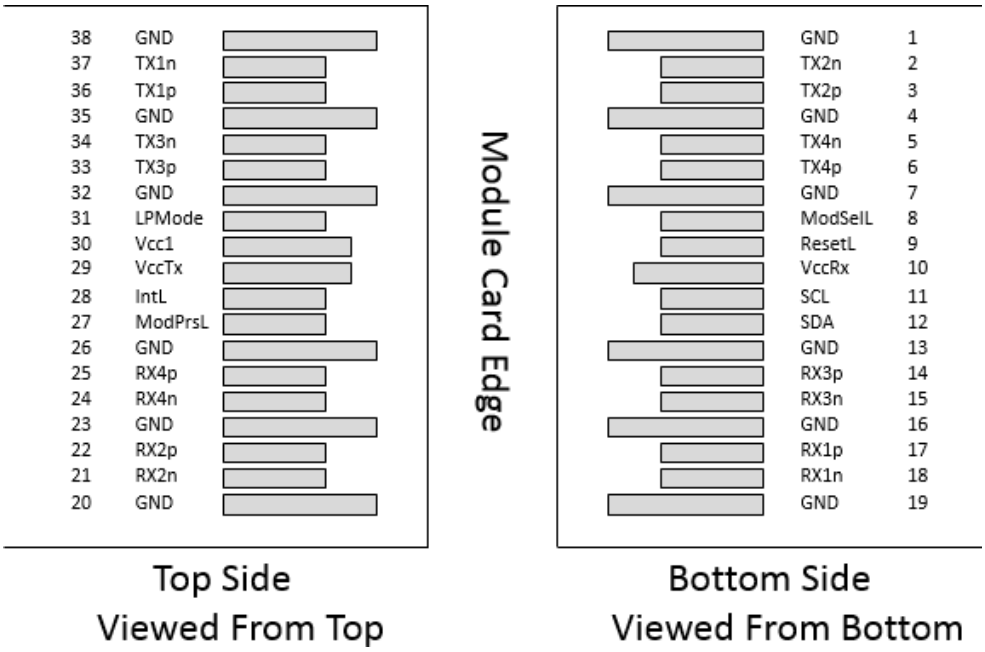


Diagram of Host Board Connector Block Pin Numbers and Name

II. Pin Descriptions

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

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

Notes:

1. GND is the symbol for single and supply(power) common for QSFP28 modules,All are common within the QSFP28 module and all module voltages are referenced to this potential otherwise noted.Connect these directly to the host board signal common ground plane.Laser output disabled on TDIS>2.0V or open,enabled on TDIS<0.8V.

2. VccRx,Vcc1 and VccTx are the receiver and transmitter power suppliers and shall be applied concurrently. Recommended host board power supply filtering is shown below.VccRx,Vcc1 and VccTx may be internally connected within the QSFP28 transceiver module in any combination.The connector pins are each rated for maximum current of 500mA.

III. Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Ref.
Storage Temperature	T_S	-40		85	ºC	
Storage Ambient Humidity	H_A	0		85	%	1
Power Supply Voltage	V_{CC}	-0.5		4	V	

Notes:

1. Non-condensing.

IV. Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Ref.
Case Operating Temperature	TOP	0	-	70	ºC	
Power Supply Voltage	Vcc	3.13	3.3	3.47	V	
Power Supply Current	Icc		1200	1800	mA	
Power Dissipation	PD			6.5	W	
Transmission Distance	TD		-	80	km	

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

Parameter	Symbol	Min.	Type	Max.	Unit	Ref.
Data Rate per Channel	-		25.78125		Gbps	1
Power Consumption	-	-	4	6.5	W	
Supply Current	Icc	-	1.2	1.8	A	
Control I/O Voltage-High	VIH	2.0		Vcc	V	
Control I/O Voltage-Low	VIL	0		0.7	V	
Inter-Channel Skew	TSK			35	Ps	
RESETL Duration	-		10		Us	
RESETL De-assert time	-			100	ms	
Power On Time	-			100	ms	

Transmitter						
Single Ended Input Voltage Tolerance	-	0.3		VCC	V	
Common mode Voltage Tolerance	-	15			mV	2
Transmit Input Diff Voltage	VI	150		1200	mV	
Transmit Input Diff Impedance	ZIN	85	100	115		
Data Dependent Input Jitter	DDJ		0.3		UI	
Receiver						
Single Ended Output Voltage Tolerance	-	0.3		4	V	
Rx Output Diff Voltage	Vo	370	600	950	mV	
Rx Output Rise and Fall Voltage	Tr/Tf			35	Ps	2
Total Jitter	TJ		0.3		UI	

Note:

1. For use of 100GBASE-ZR4.
2. 20~80%.

VI. Optical Parameters(TOP=0 to 70℃，VCC=3.0to 3.6 Volts)

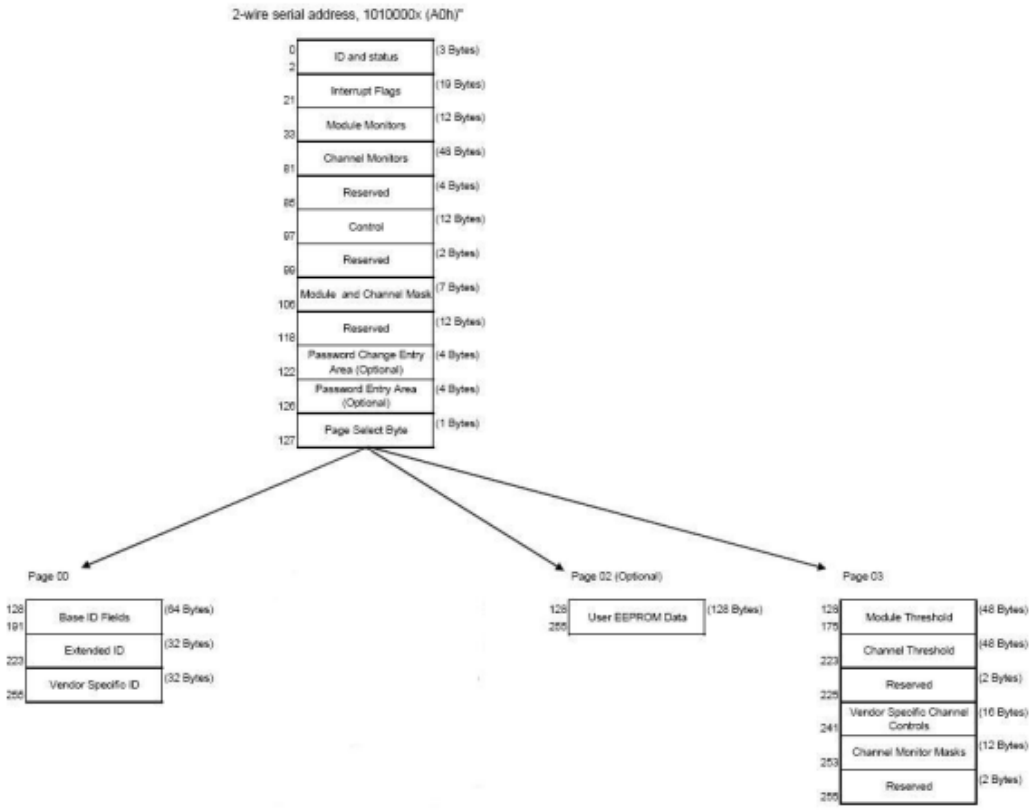
Parameters	Symbol	min	type	max	Unit	Note
Transmitter						
Transmit wavelengths	L0	1294.53	1295.56	1296.59	nm	
	L1	1299.02	1300.05	1301.09	nm	
	L2	1303.54	1304.58	1305.63	nm	
	L3	1308.09	1309.14	1310.19	nm	
Side-Mode Suppression Ratio	SMSR	30	-	-	dB	
Total Average Launch Power	PT	8	-	12.5	dBm	
Average launch power, each lane	Pavg	2	-	6.5	dBm	
Optical Modulation Amplitude (OMA), each lane		-	-	3	dB	
Extinction Ratio	ER	6	-	-	dB	
Relative Intensity Noise	Rin			-130	dB/Hz	
Average Launch Power OFF Transmitter,each Lane	Roff			-30	dBm	
Optical return loss tolerance				20	dB	
Transmitter reflectance				12	dB	

Transmitter eye mask definition {X1,X2, X3, Y1, Y2, Y3}		{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}				1
Receiver						
Damage threshold, each lane	THd			5.5	dBm	1
Average receiver power, each lane	R	-28		-7	dBm	1
Receiver sensitivity (AOP), each lane	Sen			-28	dBm	
LOS Assert	LOSA	-40			dBm	
LOS De-Assert	LOSD			-29	dBm	
LOS Hysteresis	LOSH	0.5			dB	

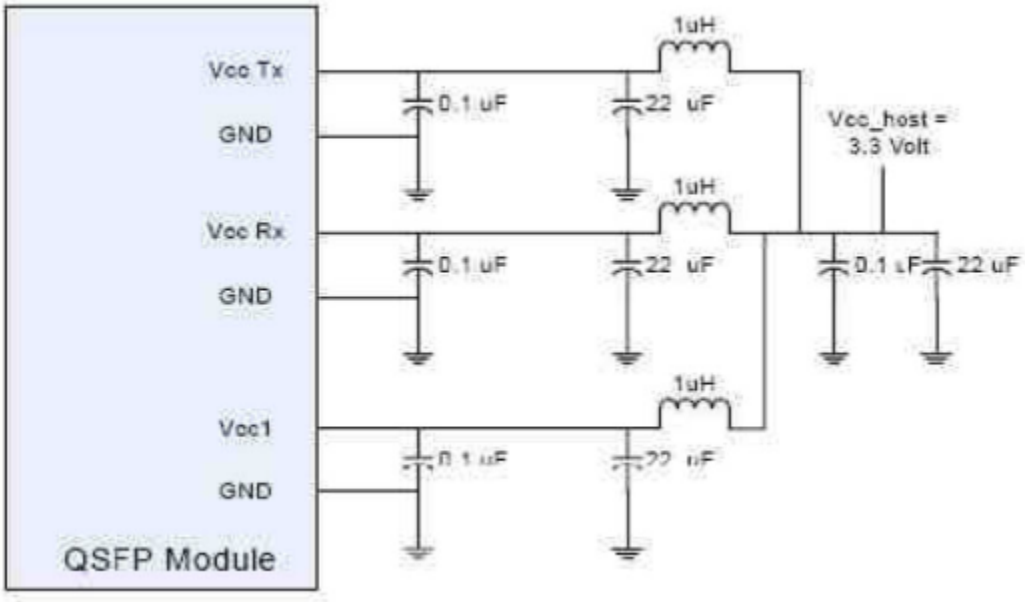
Notes:

1. Sensitivity is specified at BER@5E-5 without FEC.

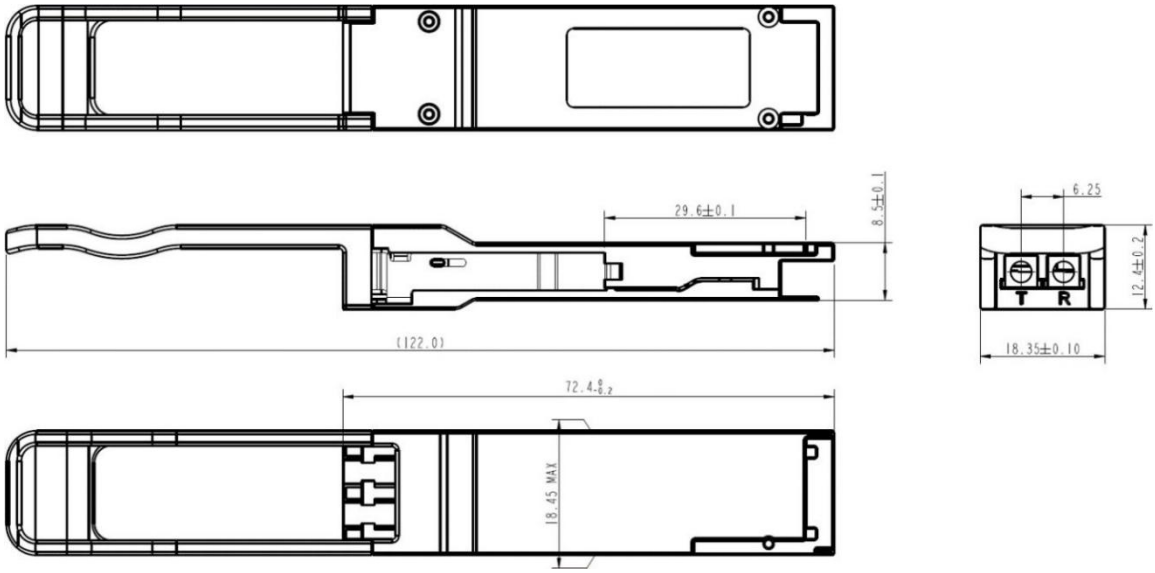
VII. Digital Diagnostic Functions



VIII. Recommended Circuit



IX. Mechanical Specifications



Mechanical Dimensions