

LQ-BLB100-ZR4C

QSFP28 100GBASE-ZR4 BIDI Optical Transceiver Module

PRODUCT FEATURES

- Support line rates from 103.125 Gb/s
- Lane bit rate 25.78 Gb/s 100GE
- Up to 80km transmission with KR4-FEC
- LAN WDM EML laser and PIN receiver with SOA
- Support Multi-Pin function with IntL/RxLOSL and LPMODE/TxDIS
- High speed I/O electrical interface (CAUI-4)
- I2C interface with integrated Digital Diagnostic monitoring
- QSFP28 MSA package with simplex LC connector
- Operating case temperature: 0°C to 70°C
- Single +3.3V power supply
 - Power dissipation
 - Commercial: < 5.5W
- Complies with EU Directive 2015/863/EU

APPLICATIONS

- 100GBASE-ZR4 100G Ethernet
- 100G Datacom&Telecom networking

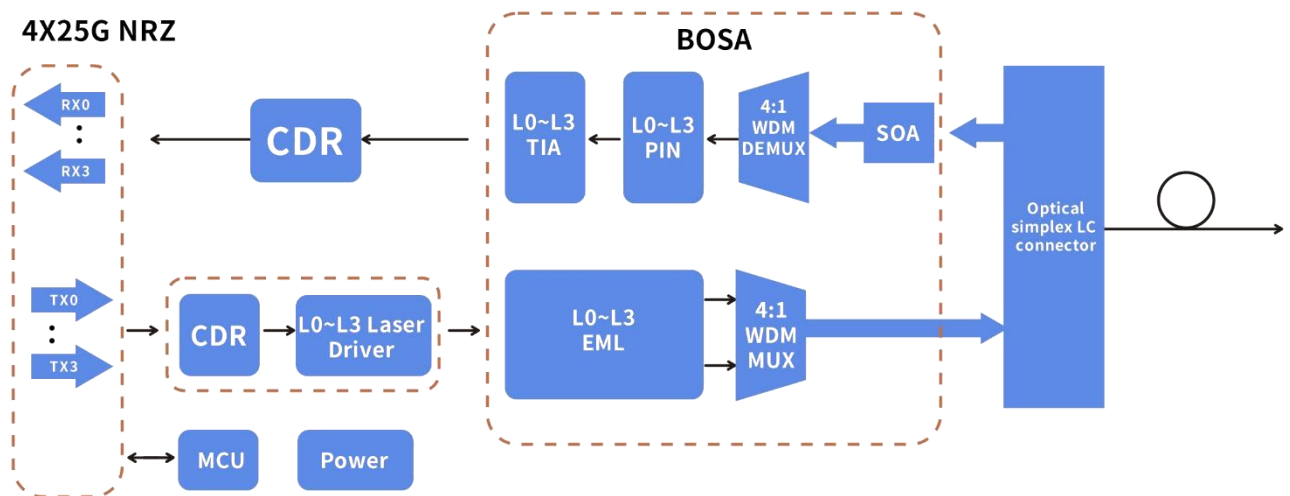
DESCRIPTIONS

It is designed for 80km optical communication applications. Optical transceiver integrates the transmit and receive path onto one module. On the transmit side, four lanes of serial data streams are recovered, retimed, and passed on to four laser drivers, which control four electric-absorption modulated lasers (Lan-WDM) with 1273,1278,1282,1286, 1296, 1300, 1305, and 1309 nm center wavelengths. The optical signals are then multiplexed into a single-mode

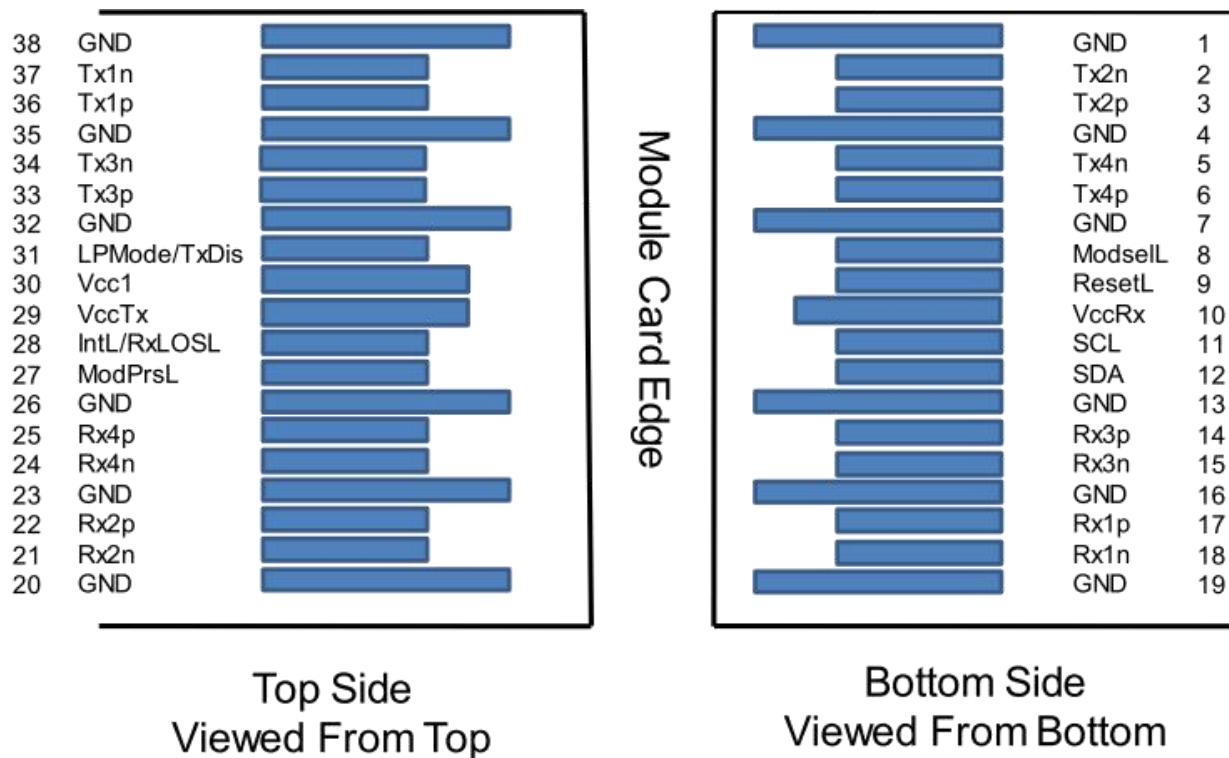


fiber through an industry-standard LC connector. On the receive side, four lanes of optical data streams are optically DE multiplexed by an integrated optical DE multiplexer. After the optical signal is amplified by SOA, DEMUX separates four channels which are recovered by PIN photodetector and cross-impedance amplifier, retimed and passed on to an output driver. This module features a hot-pluggable electrical interface, low power consumption, and 2-wire serial interface.

Transceiver Block Diagrams



Pin Descriptions



Pin	Logic	Symbol	Description	Plug Seq.	Notes
1		GND	Ground	1	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	3	
3	CML-I	Tx2p	Transmitter Non-Inverted Data output	3	
4		GND	Ground	1	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	3	
6	CML-I	Tx4p	Transmitter Non-Inverted Data output	3	
7		GND	Ground	1	1
8	LVTLL-I	ModSelL	Module Select	3	
9	LVTLL-I	ResetL	Module Reset	3	
10		VccRx	+ 3.3V Power Supply Receiver	2	2
11	LVC MOS-I/O	SCL	2-Wire Serial Interface Clock	3	
12	LVC MOS-I/O	SDA	2-Wire Serial Interface Data	3	
13		GND	Ground	1	
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	3	
15	CML-O	Rx3n	Receiver Inverted Data Output	3	
16		GND	Ground	1	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	3	
18	CML-O	Rx1n	Receiver Inverted Data Output	3	
19		GND	Ground	1	1
20		GND	Ground	1	1

21	CML-O	Rx2n	Receiver Inverted Data Output	3	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	3	
23		GND	Ground	1	1
24	CML-O	Rx4n	Receiver Inverted Data Output	3	1
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	3	
26		GND	Ground	1	1
27	LVTTL-O	ModPrsL	Module Present	3	
28	LVTTL-O	IntL/Rx_LOS	Interrupt/Rx_LOS	3	
29		VccTx	+3.3 V Power Supply transmitter	2	2
30		Vcc1	+3.3 V Power Supply	2	2
31	LVTTL-I	LPMODE/TxDIS	Low Power Mode/Tx_Disable	3	
32		GND	Ground	1	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	3	
34	CML-I	Tx3n	Transmitter Inverted Data Output	3	
35		GND	Ground	1	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	3	
37	CML-I	Tx1n	Transmitter Inverted Data Output	3	
38		GND	Ground	1	1

Notes:

1.GND is the symbol for signal and supply (power) common for the QSFP28 module. 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.Vcc Rx, Vcc1 and Vcc Tx are the receiver and transmitter power supplies and shall be applied concurrently. Requirements defined for the host side of the Host Edge Card Connector are listed in MSA. The connector pins are each rated for a maximum current of 1000 Ma.

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
Storage Temperature	TS	-40	+85	°C
Operating Case Temperature	TOP	0	70	°C
Power Supply Voltage	VCC	-0.5	3.6	V
Damage Threshold, each Lane	THd	5.5		dBm
RelativeHumidity (non-condensation)	RH	0 to 85% non-condensing		%

Recommend Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	Top	0		+70	°C
Operating Case Temperature	VCC	3.14	3.3	3.47	V
Maximum Power Dissipation	PD			5.5	W
Lane Bit Rate			25.78125		Gb/s
Transmission Distance	TD			80	km
Coupled fiber	Single mode fiber				

Notes: Optical fiber use 9/125um SMF

Electrical Characteristics

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

Parameter	Symbol	Min	Typ	Max	Unit	Note
Transmitter(Module Input)						
Data Rate, each lane			25.78125		Gbps	
Differential Voltage pk-pk	Vpp			900	Mv	1
Common Mode Voltage	Vcm	-350		2850	Mv	
Transition time	Trise/Tfall	10			ps	2
Receiver (Module Output)						
Data Rate, each lane					25.78125	
Common Mode Noise, RMS	Vrms			17.5	Mv	
Differential output voltage swing	Vout, pp			900	Mv	
Eye width	EW15	0.57			UI	
Eye height	EH15	228			mV	
Differential Termination Resistance Mismatch				10	%	1
Transition time	Trise/Tfall	12			ps	
Data Rate, each lane			25.78125		Gbps	
Common Mode Noise, RMS	Vrms			17.5	Mv	

Notes:

1.At 1 MHz.

2.20%~80%.

Optical Characteristics

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

Parameters	Symbol	min	type	max	Unit	Note
Transmitter						
Signaling Speed per Lane			25.78125		Gbps	
Center Wavelength Lane 0	λ_0	1294.53	1295.56	1296.59	nm	
Center Wavelength Lane 1	λ_1	1299.02	1300.05	1301.09	nm	
Center Wavelength Lane 2	λ_2	1303.54	1304.58	1305.63	nm	
Center Wavelength Lane 3	λ_3	1308.09	1309.14	1310.19	nm	
Center Wavelength Lane 4	λ_4	1272.55	1273.55	1274.54	nm	
Center Wavelength Lane 5	λ_5	1276.89	1277.89	1278.89	nm	
Center Wavelength Lane 6	λ_6	1281.25	1282.26	1283.27	nm	
Center Wavelength Lane 7	λ_7	1285.65	1286.66	1287.68	nm	
Total Launch Power, 100GE	PT	7		12.5	dBm	1
Average Launch Power per Lane	Pavg	1		6.5	dBm	1
OMA, each Lane	POMA	2		6.5	dBm	1
Difference in launch power between any two lanes(Average and OMA) between any Two Lanes (OMA)	Ptx,diff			3	dB	
Average Output Power (Laser Turn off)	Poff			-30	dBm	
Side Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio, 100GE	ER	8.2			dB	
RIN20OMA	RIN			-130	dB/Hz	
Optical Return Loss Tolerance	TOL			20	dB	
Transmitter Reflectance	RT			-12	dB	
Optical Eye Mask	{0.25,0.4, 0.45, 0.25, 0.28, 0.4}				%	2
Receiver						
Signaling rate, each lane			25.78125		Gbps	
Center Wavelength Lane 0	λ_0	1272.55	1273.55	1274.54	nm	
Center Wavelength Lane 1	λ_1	1276.89	1277.89	1278.89	nm	
Center Wavelength Lane 2	λ_2	1281.25	1282.26	1283.27	nm	
Center Wavelength Lane 3	λ_3	1285.65	1286.66	1287.68	nm	
Center Wavelength Lane 4	λ_4	1294.53	1295.56	1296.59	nm	
Center Wavelength Lane 5	λ_5	1299.02	1300.05	1301.09	nm	
Center Wavelength Lane 6	λ_6	1303.54	1304.58	1305.63	nm	
Center Wavelength Lane 7	λ_7	1308.09	1309.14	1310.19	nm	
Damage threshold , each lane	Pdamage	5.5			dBm	
Receiver sensitivity Average, each lane	SEN			-27	dBm	3
Los Assert	LosA	-40			dBm	
Los De-assert	LosDA			-28	dBm	

Notes:

- 1.The optical power is launched into SMF
- 2.Measured with a PRBS 231-1 test pattern @25.78125, Hit ratio $\leq$ 5E-5
- 3.Measured with a PRBS 231-1 test pattern @25.78125 Gb/s, BER $\leq$ 5E-5

Digital Diagnostic Monitoring Functions

It supports the I2C-based Diagnostic Monitoring Interface (DMI) defined in document SFF-8636. The host can access real-time performance of transmitter and receiver optical power, temperature, supply voltage and bias current.

Parameter	Unit	Specification
Temperature Monitor absolute error	°C	± 3.0
Supply Voltage Monitor absolute error	%	± 5 °C
I _{bias} Monitor absolute error	%	± 10
Received Power (Rx) Monitor absolute error	dB	± 3.0
Transmit Power (Tx) Monitor absolute error	dB	± 3.0

Recommended Interface Circuit

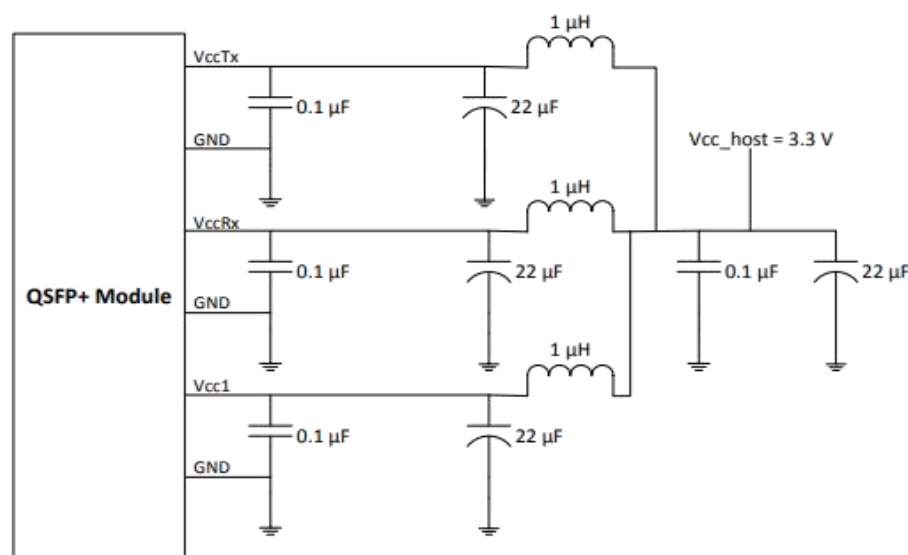
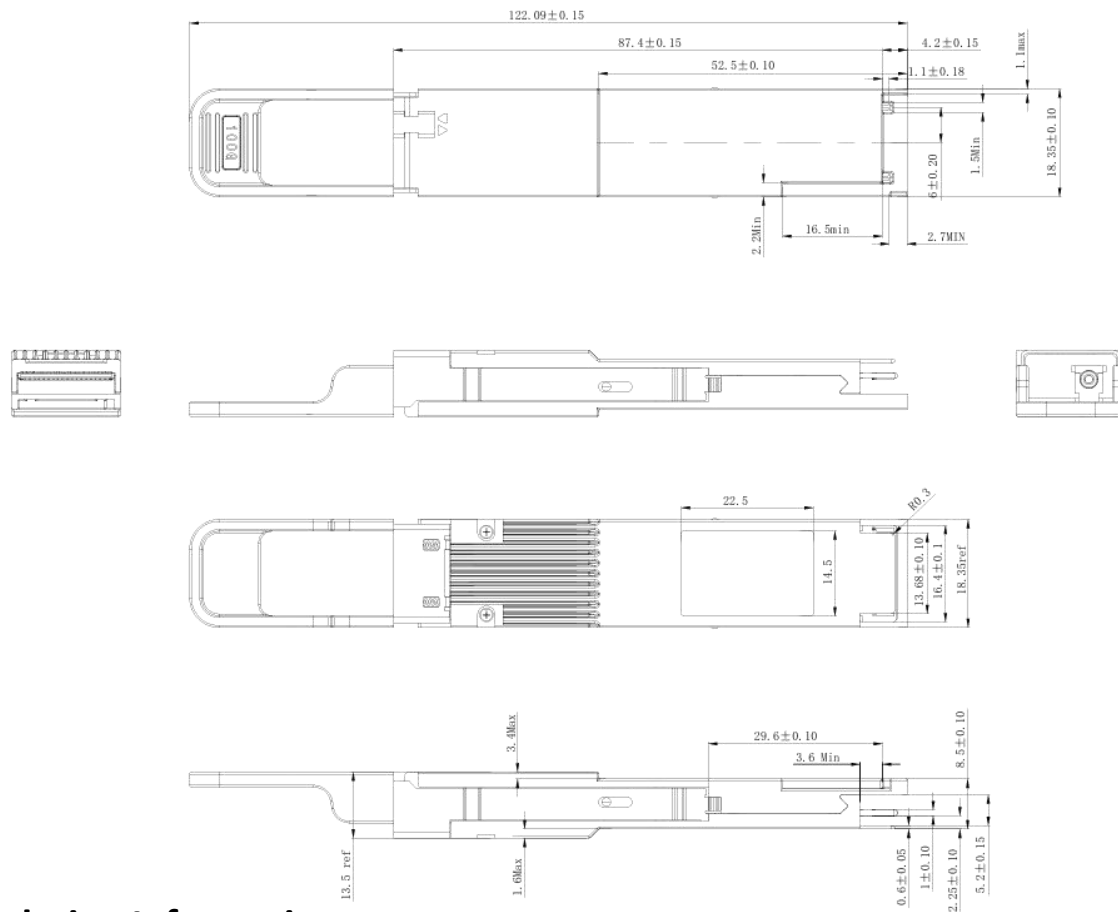


FIGURE 5-4 RECOMMENDED HOST BOARD POWER SUPPLY FILTERING

Mechanical Specifications



Ordering Information

Part Number	Description
LQ-BLA100-ZR4C	103.125G, SMF, LWDM, 80km, QSFP28, BIDI LC, 0~70℃,DDM
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