100GBASE-LR4 10km QSFP28 Optical Receiver with DDM	IP-CALK10B31CR

PRODUCT FEATURES

- QSFP28 MSA compliant
- 4x25Gb/s electrical interface
- Supports 103.125Gb/s aggregate bit rate
- Up to 10km transmission on single mode fiber
- LC duplex connector
- 4-lane Pin
- Commercial case temperature: 0 ℃o 70℃
- Single 3.3V power supply
- Maximum power consumption 1.5 Watts

APPLICATIONS

- 100GBASE-LR4 Ethernet
- Telecom Networking
- Data Center Interconnect

COMPLIANCE

- QSFP28 MSA
- SFF-8665
- IEEE802.3ba
- RoHS 2.0

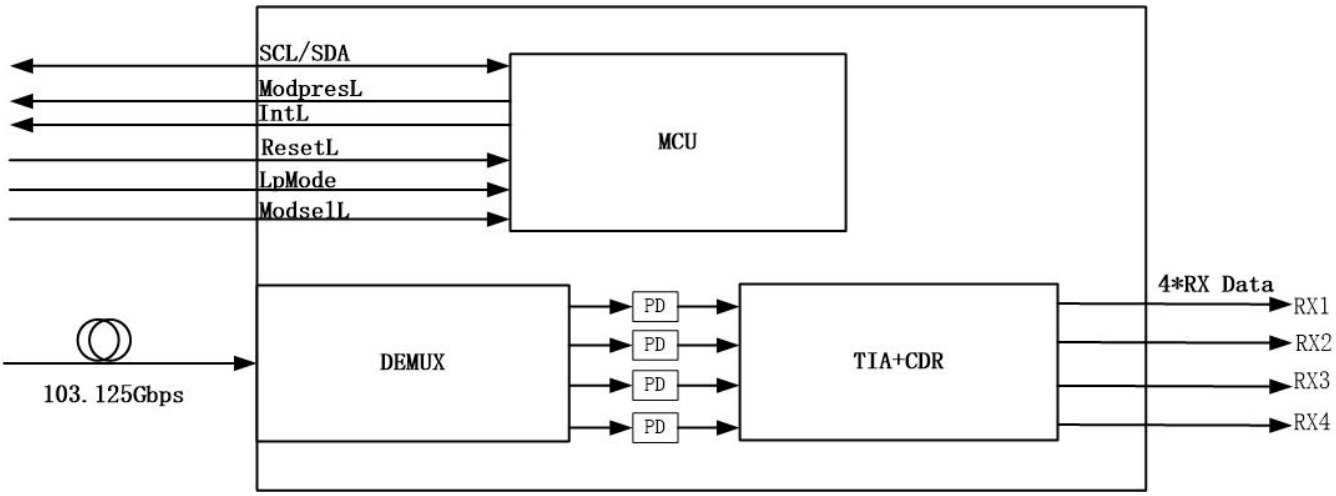
Ordering information

Part Number	Data Rate (Gb/s)	Media	Wavelength (nm)	Operating distance (km)	Temperature (℃)
IP-CALK10B31CR	103.125	SMF	LAN-WDM	10	0~70

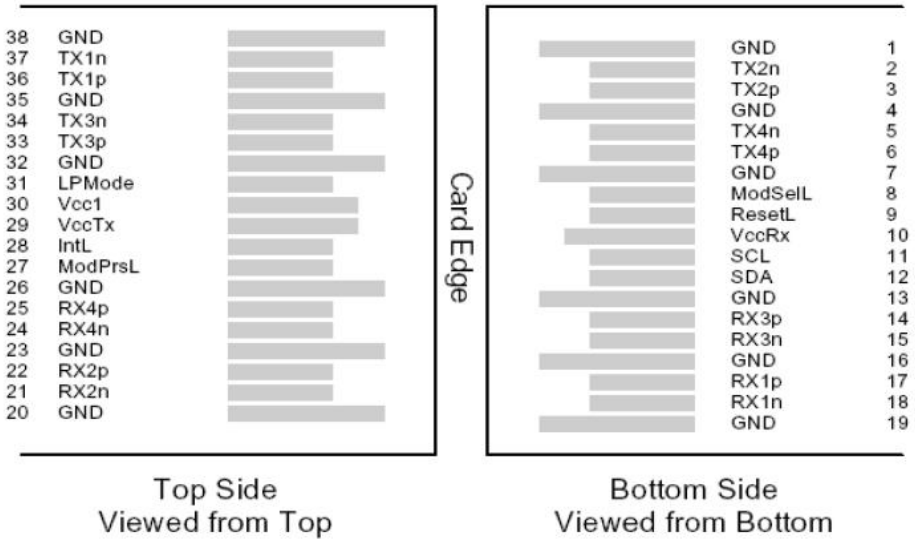
PRODUCT DESCRIPTION

IP-CALK10B31CR is designed for 10km optical communication applications. This module contains 4-lane optical receiver and module management block including 2 wire serial interfaces. The optical signals are multiplexed to a single-mode fiber through an industry standard LC connector.

1. Block Diagram



2. Pin Diagram



QSFP28 38pin connector (SFF 8665)

3. Pin Descriptions

Pin	Symbol	Name/Description	Notes
1	GND	Ground	1
2	NC	NC	
3	NC	NC	
4	GND	Ground	1
5	NC	NC	
6	NC	NC	
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 Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	1
27	ModPrSL	Module Present	
28	IntL	Interrupt	
29	NC	NC	
30	Vcc1	+3.3V Power supply	
31	LPMode	Low Power Mode	
32	GND	Ground	1
33	NC	NC	
34	NC	NC	
35	GND	Ground	1
36	NC	NC	
37	NC	NC	
38	GND	Ground	1

Notes:
1. Circuit ground is internally isolated from chassis ground.

4. 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	Typical	Max	Unit	Note
Maximum Supply Voltage	Vcc	0		4	V	
Storage Temperature	Ts	-40		85	℃	
Relative Humidity	RH	0		85	%	

5. Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit	Note
Operating Case Temperature	Tcase	0		70	℃	
Supply Voltage	VCC	3.135	3.3	3.465	V	
Relative Humidity	RH	5		85	%	
Power Dissipation	PD			1.5	W	
Data Rate (optical)	DRO		4*25.78125		Gbps	
Data Rate (Electrical)	DRE		4*25.78125		Gbps	
Link Distance	LD			10	km	

6. Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Note
Power Dissipation				1.5	W	
Supply Current	Icc			0.45	A	
Receiver						
Data Rate, each lane			25.78125		Gbps	
Output differential impedance	Rout		100		Ohm	
Differential Termination Resistance Mismatch				10	%	
Differential output voltage	Vout, pp		400		mV	

7. Optical Characteristics

Parameters	Symbol	Min	Typical	max	Unit	Note
Receiver						
Signaling Speed per Lane	BR	25.78125 ± 100 ppm			Gb/s	
Receive wavelength	λ0	1294.53		1296.59	nm	
	λ1	1299.02		1301.09	nm	
	λ2	1303.54		1305.63	nm	
	λ3	1308.09		1310.19	nm	
Damage threshold, each lane		5.5			dBm	
Average receive power, each lane		-10.6		4.5	dBm	
Receiver sensitivity, each lane(OMA)		-8.6		4.5	dBm	1
Receiver reflectance				-26	dB	
LOS Assert		-24		-13	dBm	
LOS De-Assert				-11	dBm	
LOS Hysteresis		0.5		6	dB	

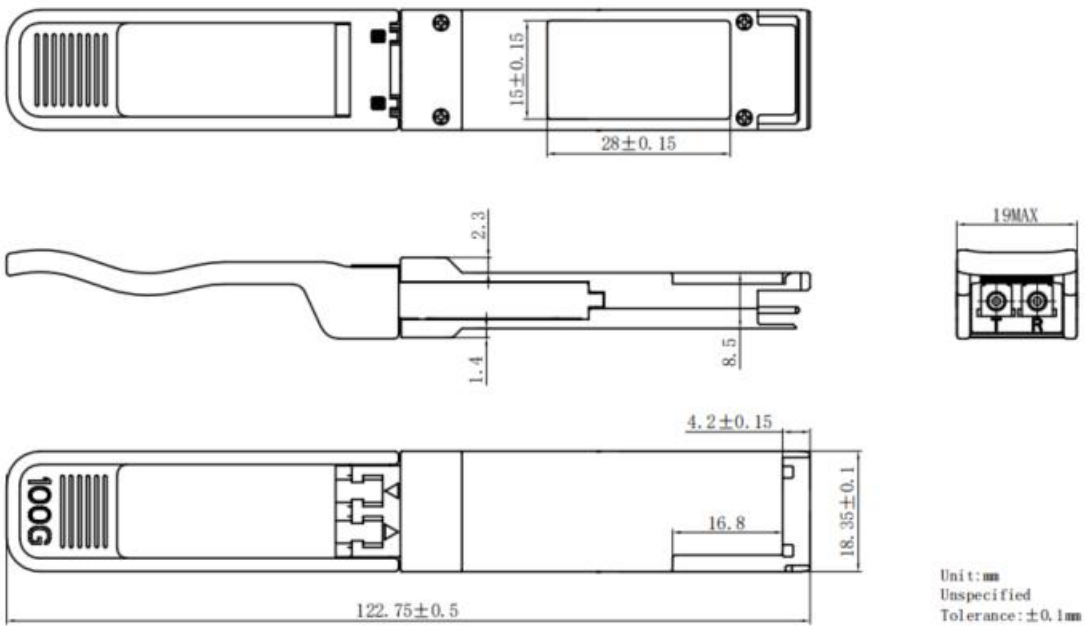
Note:
1. Sensitivity is specified at BER@1E-12.

8. Digital Diagnostic Monitoring Functions

IP-CALK10B31CR support the I2C-based Diagnostic Monitoring Interface (DMI) defined in document SFF-8665. The host can access real-time performance of transmitter and receiver optical power, temperature, supply voltage and bias current.

Parameter	Accuracy	Unit
Case Temperature	±3	℃
Supply Voltage	±3%	V
Rx Optical Power	±3	dB

9. Mechanical Specifications



10. Contact Information

Wuhan Inphilight Technology Company Limited

NO.4 Building,Bonded Optoelectronics Industrial Park,Wuhan East Lake Comprehensive Bonded Area,NO.777-30 Optics Valley 3rd Road,East Lake Hi-Technology Development Zone,Wuhan, Hubei, China

Email: sales@inphilight.com

11. Revision History

Version No.	Date	Description
1.0	Oct. 15, 2021	Preliminary datasheet
1.1	Oct. 8， 2021	Update contact Information
1.2	Jul.8,2022	Update mechanical specifications
1.3	Jun.30, 2024	Update contact information.