

CF4QD010C10D –CFP4 Dual Fibre

1310nm* / 10km / 100GBASE – LR4 & OTN OTU4

*1310nm LAN-WDM 800GHz

For your product safety, please read the following information carefully before any manipulation of the transceiver:



ESD

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all others electrical input pins, tested per MIL-STD-883G, Method 3015.4 / JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module.



LASER SAFETY

This is a Class1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

The optical ports of the module need to be terminated with an optical connector or with a dust plug in order to avoid contamination.

1. Overview

CF4QD010C10D is a high performance dual rate CFP4 transceiver module for 100Gbps data links over two single mode fibres. The maximum reach¹ is 10km, with 6.3dB end of life (EOL) power budget. The four transmitters are cooled 1310nm LAN-WDM Electro-Absorption Modulated Lasers (EML) generating four optical 25Gbps output signals, which are multiplexed together at the optical output port. The four receivers are PIN photodiodes which detect (after optical de-multiplexing) 4× 25Gbps optical input signals.

This transceiver module is compliant with the CFP Multisource Agreement (MSA) and hot pluggable. Always contact Skylane Optics' commercial agents for compatibility with different equipment platforms.

2. Features

- CFP Multi-Source Agreement compliant
- Hot pluggable CFP4 footprint
- Supports 103.125 and 111.810Gbps Data Rates
- 4× 25.781Gbps and 4× 27.9525Gbps Serial Electrical Interface (CEI-28G-VSR)
- Dual LC Optical Connector
- 4× cooled 1310nm LAN-WDM EML Transmitters
- 4× PIN Receivers
- Up to 10km Point-to-Point Transmission on Single Mode Fibre
- Operating temperature range 0°C to 70°C
- Power Dissipation <8W
- Single +3.3V Power Supply
- CFP MSA MDIO Management Interface

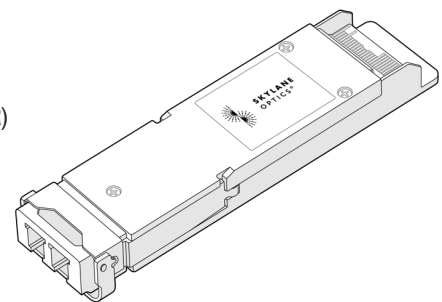


Figure 1. CFP4 Dual Fibre (non-binding illustration)

3. Applications

- IEEE 802.3ba 100GBASE-LR4
- ITU-T G.959.1 4I1-9D1F

4. Optical Interface

P/N	Wavelength	Protocol	Optical Output Power ² [dBm]	Optical Receiver Sensitivity ³ [dBm]	Optical Path Penalty ³ [dB]	Optical Receiver Overload ⁴ [dBm]	Power Budget ² [dB]
CF4QD010C10D	1310nm LAN-WDM 800GHZ	100GBASE-LR4	1.7 to 10.5	≤ -4.6	≤ 2.2	10.5	≥ 6.3
		G.959.1 4I1-9D1F	3.5 to 8.9	≤ -2.8	≤ 1.5	8.9	

1. Distance is estimated assuming typical optical losses after decent quality fibre deployment; only optical budget value is guaranteed.

2. EOL over operating temperature range

3. See section 5.2 for definitions

4. The optical input to the receiver should not exceed this value. Transmitters must never be directly connected to receivers (optical loop back) before ensuring that proper optical attenuation is used

5. Technical Parameters

5.1. Recommended Operating Conditions

Parameter	Min	Typ	Max	Unit	Notes
Storage temperature	-40		85	°C	
Operating Case Temperature	0		70	°C	
Relative Humidity	5		85	%	Non-Condensing
Power Supply Voltage	3.2	3.3	3.4	V	
Power Supply Current			1870	mA	
Power Dissipation			6	W	

5.2. Transmitter Optical Specifications

100GBASE-LR4					
Parameter	Min	Typ	Max	Unit	Notes
Data Rate, each Lane		25.781		Gbps	5
Aggregated Data Rate		103.125		Gbps	5
Average Output Power			10.5	dBm	6, 8
Average Output Power, each Lane	-4.3		4.5	dBm	6, 8
Output Power Difference between any two Lanes			5	dB	
Centre Wavelength, Optical Lanes 0 to 3	1294.53	1295.56	1296.59	nm	
	1299.02	1300.05	1301.09		
	1303.54	1304.58	1305.63		
	1308.09	1309.14	1310.19		
Transmitter and Dispersion Penalty (TDP), each Lane			2.2	dB	9
Extinction Ratio, each Lane	4			dB	
411-9D1F					
Parameter	Min	Typ	Max	Unit	Notes
Data Rate, each Lane		27.952		Gbps	7
Aggregated Data Rate		111.810		Gbps	7
Average Output Power			8.9	dBm	8
Average Output Power, each Lane	-2.5		2.9	dBm	8
Output Power Difference between any two Lanes			5	dB	
Centre Wavelength, Optical Lanes 0 to 3	1294.53	1295.56	1296.59	nm	
	1299.02	1300.05	1301.09		
	1303.54	1304.58	1305.63		
	1308.09	1309.14	1310.19		
Optical Path Penalty			1.5	dB	9
Extinction Ratio, each Lane	7			dB	

5. IEEE 802.3ba-2012
6. Minimum value corresponding to OMA_≥ -1.3dBm. Maximum value corresponding to OMA_≤ 4.5dBm
7. ITU-T G.959.1 (02/12), optical interface 411-9D1F
8. Output power coupled into a 9/125 μm single mode fibre
9. Optical path dispersion between -28.5 and 9.5ps/nm

5.3. Receiver Optical Specifications					
100GBASE-LR4					
Parameter	Min	Typ	Max	Unit	Notes
Operating Wavelength, Optical Lanes 0 to 3	1294.53	1295.56	1296.59	nm	
	1299.02	1300.05	1301.09		
	1303.54	1304.58	1305.63		
	1308.09	1309.14	1310.19		
Receiver Overload	10.5			dBm	10
Receiver Overload, each Lane	4.5			dBm	10
Receiver Sensitivity			-4.6	dBm	10
Receiver Sensitivity, each Lane			-10.6	dBm	11
Input Power Difference between any two Lanes			5.5	dB	
411-9D1F					
Parameter	Min	Typ	Max	Unit	Notes
Operating Wavelength, Optical Lanes 0 to 3	1294.53	1295.56	1296.59	nm	
	1299.02	1300.05	1301.09		
	1303.54	1304.58	1305.63		
	1308.09	1309.14	1310.19		
Receiver Overload	8.9			dBm	12
	10				13
Receiver Overload, each Lane	2.9			dBm	12
	4				13
Receiver Sensitivity			-2.8	dBm	12
			-0.9		13
Receiver Sensitivity, each Lane			-8.8	dBm	12
			-6.9		13
Input Power Difference between any two Lanes			5.5	dB	

- 10. BER $\leq 10^{-12}$, PRBS 2³¹-1
- 11. BER $\leq 10^{-12}$, PRBS 2³¹-1. Corresponding to OMA ≤ -8.6 dBm using ER=9dB
- 12. BER $\leq 10^{-12}$, ER ≥ 7 dB, with FEC. The BER can be significantly higher at the input to the FEC decoder
- 13. BER $\leq 10^{-12}$, 7dB>ER ≥ 4 dB, with FEC. The BER can be significantly higher at the input to the FEC decoder

6. Transceiver Electrical Pad Layout

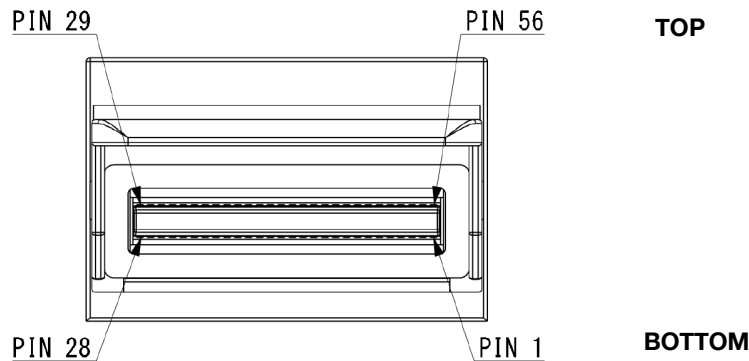


Figure 2. Transceiver Electrical Pad Layout



7. Module Electrical Pin Definition

Pin	Symbol	I/O	Description	Logic	Pin	Symbol	I/O	Description	Logic
1	3.3V_GND		3.3V Power Supply		29	GND		Ground	
2	3.3V_GND				30	RX0p	O	Ch0 25Gbps Receive Output	CML
3	3.3V				31	RX0n			
4	3.3V				32	GND		Ground	
5	3.3V				33	RX1p	O	Ch1 25Gbps Receive Output	CML
6	3.3V				34	RX1n			
7	3.3V_GND		Ground		35	GND		Ground	
8	3.3V_GND				36	RX2p	O	Ch2 25Gbps Receive Output	CML
9	VND_IO_A		Do not connect		37	RX2n			
10	VND_IO_B				38	GND		Ground	
11	TX_DIS	I	Transmitter Disable	LVC MOS w/ PUR	39	RX3p	O	Ch3 25Gbps Receive Output	CML
12	RX_LOS	O	Loss of Optical Input Signal	LVC MOS	40	RX3n			
13	GLB_ALRMn	O	Global Alarm	LVC MOS (open drain)	41	GND		Ground	
14	MOD_LOPWR	I	Module Low Power Mode	LVC MOS w/ PUR	42	REFCLKp		Not for normal use	
15	MOD_ABS	O	Module Absent Indicator	GND	43	REFCLKn			
16	MOD_RSTn	I	Module Reset	LVC MOS w/ PDR	44	GND		Ground	
17	MDC	I	Management Data Clock	1.2V CMOS	45	TX0p	I	Ch0 25Gbps Transmit Input	CML
18	MDIO	I/O	Management bi-dir. Data	1.2V CMOS	46	TX0n			
19	PRTADR0		MDIO Physical Port addr. bit0	1.2V CMOS	47	GND		Ground	
20	PRTADR1	I	MDIO Physical Port addr. bit1		48	TX1p	I	Ch1 25Gbps Transmit Input	CML
21	PRTADR2		MDIO Physical Port addr. bit2		49	TX1n			
22	VND_IO_C		Do not connect		50	GND		Ground	
23	VND_IO_D				51	TX2p	I	Ch2 25Gbps Transmit Input	CML
24	VND_IO_E				52	TX2n			
25	GND		Ground		53	GND		Ground	
26	MCLKn		Not for normal use		54	TX3p	I	Ch3 25Gbps Transmit Input	CML
27	MCLKp				55	TX3n			
28	GND		Ground		56	GND		Ground	

8. Register Allocation

The total CFP register space (from 8000h to FFFFh) is logically divided into 8 pages with each page starting at even hex thousand, that is, 8000h, 9000h, A000h, ..., F000h, with each page further divided into 32 tables.

The CFP MSA specifies the starting address of all non-volatile registers (NVR) at 8000h (8 NVR tables in total).

Page A000h is allocated for volatile registers (VR). The CFP MSA specifies four VR tables for module configuration, control, and various DDM related functions.

Start Address (hex)	End Address (hex)	Table Name and Description
0000	7FFF	Reserved for IEEE 802.3 use
8000	807F	CFP NVR 1 Table: Base ID Registers
8080	80FF	CFP NVR 2 Table: Alarm/Warning Threshold Registers
8100	817F	CFP NVR 3 Table: Network Lane BOL Measurement Registers
8180	81FF	CFP NVR 4 Table
8200	83FF	MSA Reserved
8400	847F	NVR 1: Vendor Data Registers
8480	84FF	NVR 2: Vendor Data Registers
8500	87FF	Reserved by CFP MSA
8800	887F	NVR 1: User Data Registers
8880	88FF	NVR 2: User Data Registers
8900	8EFF	Reserved by CFP MSA
8F00	8FFF	Reserved for User private use
9000	9FFF	Reserved for vendor private use
A000	A07F	CFP Module VR 1: CFP Module Level Control and DDM registers
A080	A0FF	MLG VR 1: MLG Management Interface Registers
A100	A1FF	Reserved by CFP MSA
A200	A27F	Network Lane VR 1: Network Lane Specific Registers
A280	A2FF	Network Lane VR 2: Network Lane Specific Registers
A300	A37F	Network Lane VR 3: Network Lane and Vendor Specific FAWS Registers
A380	A3FF	Reserved by CFP MSA
A400	A47F	Host Lane VR 1: Host Lane Specific Registers
A480	ABFF	Reserved by CFP MSA
AC00	AFFF	Common Data Block Registers
B000	BFFF	Allocated for OIF MSA-100GLH modules
C000	FFFF	Reserved by CFP MSA

Figure 3. Register of a CFP

Datasheet

CF4QD010C10D.docx



9. Ordering Information

Part Number	Description
CF4QD010C10D	CFP4 LR-4, 1310nm LAN-WDM, Tx (EML), Rx (PIN), maximum distance 10km on SMF, power budget 6.3dB, 100 Gigabit Ethernet & OTN OTU4, dual LC connector, 0°C to 70°C, DDM

10. Document Revision Information

Revision	Description
A	Initial release

Skylane Optics supplies a broad range of optical transceivers. Our engineers work closely with our customers to find the best solutions for every application. We are committed to provide high quality products and services to our customers.

For questions on this product please contact:
support@skylaneoptics.com

The graphic consists of three overlapping circles. The top circle is teal and contains the text "Beyond Quality". The bottom-left circle is yellow and contains the text "Performing Smartly". The bottom-right circle is red and contains the text "Reliable Alliance".