

## CFP-100G-LR4

Single-Mode OTU4 411-9D1F CFP Transceiver  
Single-Mode 100GBASE-LR4 CFP Transceiver  
RoHS6 Compliant



### Product Description

Opticonnect CFP-100G-LR4 is a CFP 100GBASE-LR4 module and supports a link length of 10 kilometers on standard single-mode fiber (SMF, G.652). 100 Gigabit Ethernet signal is carried over four wavelengths. Multiplexing and demultiplexing of the four wavelengths are managed within the device.

### Features

- Supports 103Gbps and 112Gbps aggregate bit rates
- Single 3.3V Power Supply and Power dissipation < 16W
- Up to 10km transmission on SMF
- Hot-Pluggable CFP Footprint Duplex LC Connector Interface
- Class 1 FDA and IEC60825-1 Laser Safety Compliant
- RoHS6 Compliant
- Operating Case Temperature Extended: -10 °C ~+75 °C
- Compliant with CFP MSA Specification
- MDIO interface with integrated Digital Diagnostic Monitoring
- CAUI electrical interface

### Applications

- OTU4 411-9D1F
- 100GBASE-LR4 Ethernet
- Data center

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*Opticonnect SYSTEMS B.V., an Optical Networking vendor with its headquarters in the Netherlands, provides Optical Transport solutions and Optical Transceivers at the best price performance ratio possible. Our goal is to simplify the planning, deployment and maintenance of*

*complex Optical Networks. This is achieved by our user friendly planning apps and information, sophisticated products and transparent support. Relying on our superior product quality, all items are supplied with life time warranty.*

## Ordering information

Part No.	Data Rate	Fiber Type	Distance <sup>(note2)</sup>	Interface	Temp.	DDMI
CFP-100G-LR4 <sup>(note1)</sup>	112Gbps <sup>(Note3)</sup>	SMF	10km	LC	Extended	Yes

Note1: Standard version

Note2: 10km with 9/125µm SMF

Note3: Can change to 100GBASE-LR4 rate through MDIO.

## Regulatory Compliance

Product Certificate	Certificate Number	Applicable Standard
TUV	R50135086	EN 60950-1:2006+A11+A1+A12
		EN 60825-1:2007
		EN 60825-2:2004+A1+A2
UL	E317337	UL 60950-1
		CSA C22.2 No. 60950-1-07
EMC CE	AE 50135430 0001	EN 55022:2006
		EN 55024:1998+A1+A2
CB	JPTUV-024038-M1	IEC 60825-2
		IEC 60950-1
FCC	WTF13F0503735E	47 CFR PART 15 OCT., 2010
	WTF13F0503732E	47 CFR PART 15 OCT., 2010
FDA	1230816-000	CDRH 1040.10
ROHS	RLSZF00163462	2011/65/EU

## Absolute Maximum Ratings <sup>\*note4</sup>

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T <sub>s</sub>	-40	+85	°C
Operating Case Temperature	T <sub>c</sub>	-10	+75	°C
Supply Voltage	V <sub>cc</sub>	-0.5	3.6	V
Operating Relative Humidity	RH	5	85	%

Note 4: Exceeding any one of these values may destroy the device permanently

## Recommended Operating Conditions

Parameter	Symbol		Min.	Typical	Max.	Unit
Operating Case Temperature	T <sub>c</sub>	CFP-100G-LR4	-10		+75	°C
Power Supply Voltage	V <sub>cc</sub>		3.2	3.3	3.4	V
Power Supply Current	I <sub>cc</sub>		4000		mA	mA

## Performance Specifications – Electrical

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Transmitter						
Input Amplitude(Differential)	Vin			1050	mVpp	AC coupled inputs <sup>(note7)</sup>
Input Impedance (Differential)	Zin	80	100	120	ohms	Rin > 100 kohms @ DC
Receiver						
Output Amplitude (Differential)	Vout	360		770	mVpp	AC coupled outputs <sup>(note 7)</sup>
Output Impedance (Differential)	Zout	80	100	120	ohm	

## 1.2V MDIO Interface Specifications

Parameter	Symbol	Min.	Typ.	Max	Unit
Input Voltage	VIH	0.84		1.5	V
	VIL	-0.3		0.36	V
Input Leak current	IIN	-100		100	uA
Output Voltage	VOH	1.0		1.5	V
	VOL	-0.3		0.2	V
Input Capacitance	CI			10	pF
Input MDC Clock	fMDC	0.1		4	MHz
MDC Clock Period	TMDC	250		10000	ns
MDIO Hold Time	Thold	10			ns
MDIO SetupTime	Tsetup	10			ns
GLB_ALM	Tglb_alm_ass			150	ms
	Tglb_alm_dea			150	ms

## Optical and Electrical Characteristics

### OTU4 411-9D1F Operation

Parameter	Symbol	Min.	Typical	Max.	Unit
Transmitter					
Signaling Speed per Lane	BRAVE		27.95		Gbps
Lane_0 Center Wavelength	$\lambda_{C0}$	1294.53	1295.56	1296.59	nm
Lane_1 Center Wavelength	$\lambda_{C1}$	1299.02	1300.05	1301.09	nm
Lane_2 Center Wavelength	$\lambda_{C2}$	1303.54	1304.58	1305.63	nm
Lane_3 Center Wavelength	$\lambda_{C3}$	1308.09	1309.14	1310.19	nm
Total Average Output Power <sup>(Note5)</sup>	Po	-		8.9	dBm
Average Launch Power per Lane	Peach	-2.5		2.9	dBm
Side Mode Suppression Ratio	SMSR	30			dB

Optical Return Loss Tolerance			20	dB	us
Extinction Ratio <sup>(Note6)</sup>	ER	7			dB
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3} <sup>(Note6)</sup>		G.959.1 Compliant			
TX Disable Assert Time	t <sub>off</sub>			100	us
Receiver					
Signaling Speed per Lane	BRAVE		27.95		Gbps
Lane_0 Center Wavelength	$\lambda_{C0}$	1294.53	1295.56	1296.59	nm
Lane_1 Center Wavelength	$\lambda_{C1}$	1299.02	1300.05	1301.09	nm
Lane_2 Center Wavelength	$\lambda_{C2}$	1303.54	1304.58	1305.63	nm
Lane_3 Center Wavelength	$\lambda_{C3}$	1308.09	1309.14	1310.19	nm
Average Receive Power per Lane	R <sub>pow</sub>	-8.8		2.9	dBm
Receive Sensitivity per Lane <sup>(Note8)</sup>	P <sub>min</sub>			-10.3	dBm
Receiver Overload per Lane	P <sub>max</sub>	4.5			dBm
Optical Return Loss	ORL			-26	dB
LOS Assert	LOSA	-21			dBm
LOS De-Assert	LOSD			-11	dBm
LOS Hysteresis		0.5			dB

## 100GBASE-LR4 Operation

Parameter	Symbol	Min.	Typical	Max.	Unit
Transmitter					
Signaling Speed per Lane	BRAVE		25.78		Gbps
Lane_0 Center Wavelength	$\lambda_{C0}$	1294.53	1295.56	1296.59	nm
Lane_1 Center Wavelength	$\lambda_{C1}$	1299.02	1300.05	1301.09	nm
Lane_2 Center Wavelength	$\lambda_{C2}$	1303.54	1304.58	1305.63	nm
Lane_3 Center Wavelength	$\lambda_{C3}$	1308.09	1309.14	1310.19	nm
Total Average Output Power <sup>(Note5)</sup>	P <sub>o</sub>	-		10.5	dBm
Average Launch Power per Lane	P <sub>each</sub>	-4.3		4.5	dBm
Side Mode Suppression Ratio	SMSR	30			dB
Optical Return Loss Tolerance				20	dB
Extinction Ratio <sup>(Note6)</sup>	ER	7			dB
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3} <sup>(Note6)</sup>		IEEE802.3ba-2010 Compliant			
TX Disable Assert Time	t <sub>off</sub>			100	us
Receiver					
Signaling Speed per Lane	BRAVE		25.78		Gbps
Lane_0 Center Wavelength	$\lambda_{C0}$	1294.53	1295.56	1296.59	nm

Lane_1 Center Wavelength	$\lambda_{C1}$	1299.02	1300.05	1301.09	nm
Lane_2 Center Wavelength	$\lambda_{C2}$	1303.54	1304.58	1305.63	nm
Lane_3 Center Wavelength	$\lambda_{C3}$	1308.09	1309.14	1310.19	nm
Average Receive Power per Lane	$R_{pow}$	-10.6		4.5	dBm
Receive Sensitivity per Lane <sup>(Note8)</sup>	Pmin			-10.6	dBm
Receiver Overload per Lane	Pmax	4.5			dBm
Optical Return Loss	ORL			-26	dB
LOS Assert	LOSA	-21			dBm
LOS De-Assert	LOSD			-11	dBm
LOS Hysteresis		0.5			dB

Note5: Output is coupled into a 9/125 $\mu$ m single-mode fiber.

Note6: Filtered, measured with a PRBS 231-1 test pattern.

Note7: High speed I/O, internally AC coupled.

Note8: Minimum average optical power measured at BER less than 1E-12, with a 231-1 PRBS.