

CFP2 100G 10KM SMF MULTI-RATE

SLCF2-100G-LR4



Overview

Sourcelight's SLCF2-100G-LR4 are designed for use in 100 Gigabit Ethernet and 4x28G OTN client interfaces over single mode fiber.

They are compliant with the CFP MSA1, IEEE 802.3ba 100GBASE-LR42 and OTU4 4I1-9D1F requirements specified in ITU-T Recommendations G.959.1/G.709 and Supplement 39 (G.sup39). Digital diagnostics functions are available via the MDIO interface, as specified by the CFP MSA. The transceiver is RoHS-6 compliant and lead-free per Directive 2002/95/EC3.

Features

- ◆ Hot-pluggable CFP2 form factor
- ◆ Supports 103.1Gb/s and 112Gb/s aggregate bit rates
- ◆ Power dissipation < 8W
- ◆ RoHS-6 compliant (lead-free)
- ◆ Commercial case temperature range of 0°C to 70°C
- ◆ Single 3.3V power supply
- ◆ Maximum link length of 10km on Single Mode Fiber (SMF)
- ◆ 4x28Gb/s DFB-based LAN-WDM transmitter
- ◆ 4x28G electrical interface
- ◆ Duplex LC receptacles
- ◆ MDIO management interface

Applications

- ◆ OTN OTU4 4I1-9D1F
- ◆ 100GBASE-LR4 100G Ethernet

Ordering Information

Part Number	Product Description
SLCF2-100G-LR4	CFP2 100G LR4 10Km LC straight receptacles on SMF

General Specifications

Parameter	Symbol	Min	Typical	Max	Units	Note
Bit Rate (all wavelengths combined)	BR	103.1		112.0	Gb/s	
Bit Error Ratio @25.78Gb/s	BER1			10-12		
Bit Error Ratio @27.95Gb/s	BER2			10-6		
Maximum Supported Distances	Lmax1			10	Km	SMF G.652

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Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.5	4.0	V
Storage Temperature	Tst	-40	85	°C
Case Operating Temperature	Top	-5	75	°C
Humidity (non-condensing)	Rh	15		%
Receiver Damage Threshold, per Lane	PRdmg	5.5		dBm

Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Note
Supply Voltage	Vcc	3.2		3.4	V	
Supply Current	Icc			2.5	A	
Module total power	P			8	W	1
Transmitter						
Signaling rate per lane				27.95	Gb/s	2
Input differential impedance	R _{in}	CEI-28G-VSR as defined by the OIF			Ω	
Differential data input swing per lane	V _{in,pp}				mV	
Data input rise time tolerance	t _r				ps	
Data input rise time tolerance	t _f				ps	
Electrical input eye mask definition	{X1, X2} {Y1, Y2}				UI mV	
Receiver						
Signaling rate per lane				11.2	Gb/s	2
Differential data output swing per lane	V _{out,pp}	CEI-28G-VSR as defined by the OIF			mV	
Data output rise time	t _r				ps	
Data output fall time	t _f				ps	
Electrical output eye mask definition	{X1, X2} {Y1, Y2}				UI mV	
Power Supply Noise Tolerance	Vrip	Per Table 4-1 in the CFP2 MSA document ¹				

Note:

1. Maximum total power value is specified across the full temperature and voltage range.
2. +/- 100ppm

Optical Characteristics

OTU4 Operation

Parameter	Symbol	Min	Typical	Max	Unit	Note
Transmitter						
Signaling Speed per Channel		27.95		27.95	Gb/s	1
Channel center wavelengths (range)			1294.53 – 1296.59 1299.02 – 1301.09 1303.54 – 1305.63 1308.09 – 1310.19		nm	
Total Average Launch Power	POUT			10	dBm	
Average Launch Power per Channel	TXPx	-2.9		4.5	dBm	
Optical Channel Extinction Ratio	ER	4.0		6.5	dB	
Channel Power Difference	Δ POUT			5	dB	
Optical Return Loss	ORL			20	dB	
Receiver						
Signaling Speed per Channel		27.95		27.95	GBd	2
Channel center wavelengths (range)			1294.53 – 1296.59 1299.02 – 1301.09 1303.54 – 1305.63 1308.09 – 1310.19		nm	
Average Input Power per Channel	RXPx	-6.9		4.0	dBm	3
Optical Path Penalty	OPP			1.5	dB	
Equivalent Sensitivity per Channel	Rxsens			-9.2	dBm	3
Total Average Input Power	PIN			10.0	dBm	
Channel Power Difference	Δ PIN			5.5	dB	
LOS De-Assert	LOSD			-11.6	dBm	
LOS Assert	LOSA			-13.6	dBm	
LOS Hysteresis			1		dBm	

Note:

1. Transmitter consists of 4 lasers operating at 27.95Gb/s each.
2. Receiver consists of 4 photodetectors operating at 27.95Gb/s each.
3. Specified at a BER of 10^{-6} (pre-FEC), per ITU-T G.sup39.

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100GbE Operation

Parameter	Symbol	Min	Typical	Max	Unit	Note
Transmitter						
Signaling Speed per Lane		25.78		25.78	Gb/s	1
Lane center wavelengths (range)			1294.53 – 1296.59 1299.02 – 1301.09 1303.54 – 1305.63 1308.09 – 1310.19		nm	
Total Average Launch Power	P _{OUT}			10.5	dBm	
Transmit OMA per Lane	TxOMA	-1.3		4.5	dBm	
Average Launch Power per Lane	TXP _x	-4.3		4.5	dBm	2
Optical Extinction Ratio	ER	4			dB	
Sidemode Suppression ratio	SSR _{min}	30			dB	
Average launch power of OFF transmitter, per lane				-30	dBm	
Relative Intensity Noise	RIN			-130	dB/Hz	
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}			
Receiver						
Signaling Speed per Lane		25.78		25.78	GBd	3
Lane center wavelengths (range)			1294.53 – 1296.59 1299.02 – 1301.09 1303.54 – 1305.63 1308.09 – 1310.19		nm	
Receive Power (OMA) per Lane	RxOMA			4.5	dBm	
Average Receive Power per Lane	RXP _x	-10.6		4.5	dBm	4
Receiver Sensitivity (OMA) per Lane	Rxsens			-10.2	dBm	
Stressed Receiver Sensitivity (OMA) per Lane	SRS			-6.8	dBm	
Return Loss	RL	-26			dB	
Vertical eye closure penalty, per lane				1.8	dB	
Receive electrical 3 dB upper cutoff frequency, per lane				31	GHz	
LOS De-Assert	LOSD			-11.6	dBm	
LOS Assert	LOSA			-13.6	dBm	
LOS Hysteresis			1		dBm	

Note:

1. Transmitter consists of 4 lasers operating at 25.78Gb/s each.
2. Minimum value is informative.
3. Receiver consists of 4 photodetectors operating at 25.78Gb/s each.
4. Minimum value is informative, equals min TxOMA with infinite ER and max channel insertion loss.

Pin Descriptions

	Top Row		Bottom Row		Top Row		Bottom Row
104	GND	1	GND	78	<i>{REFCLKp}</i>	27	MOD_ABS
103	N.C.	2	<i>{TX_MCLKn}</i>	77	GND	28	MOD_RSTn
102	N.C.	3	<i>{TX_MCLKp}</i>	76	N.C.	29	GLB_ALRMn
101	GND	4	GND	75	N.C.	30	GND
100	TX3n	5	N.C.	74	GND	31	MDC
99	TX3p	6	N.C.	73	RX3n	32	MDIO
98	GND	7	3.3V_GND	72	RX3p	33	PRTADR0
97	TX2n	8	3.3V_GND	71	GND	34	PRTADR1
96	TX2p	9	3.3V	70	RX2n	35	PRTADR2
95	GND	10	3.3V	69	RX2p	36	VND_IO_C
94	N.C.	11	3.3V	68	GND	37	VND_IO_D
93	N.C.	12	3.3V	67	N.C.	38	VND_IO_E
92	GND	13	3.3V_GND	66	N.C.	39	3.3V_GND
91	N.C.	14	3.3V_GND	65	GND	40	3.3V_GND
90	N.C.	15	VND_IO_A	64	N.C.	41	3.3V
89	GND	16	VND_IO_B	63	N.C.	42	3.3V
88	TX1n	17	PRG_CNTL1	62	GND	43	3.3V
87	TX1p	18	PRG_CNTL2	61	RX1n	44	3.3V
86	GND	19	PRG_CNTL3	60	RX1p	45	3.3V_GND
85	TX0n	20	PRG_ALRM1	59	GND	46	GND
84	TX0p	21	PRG_ALRM2	58	RX0n	47	N.C.
83	GND	22	PRG_ALRM3	57	RX0p	48	N.C.
82	N.C.	23	GND	56	GND	49	GND
81	N.C.	24	TX_DIS	55	N.C.	50	<i>{RX_MCLKn}</i>
80	GND	25	RX_LOS	54	N.C.	51	<i>{RX_MCLKp}</i>
79	<i>{REFCLKn}</i>	26	MOD_LOPWR	53	GND	52	GND

Figure1. Pin Descriptions

Bottom Row Pin Function Definition

The CFP2 connector has 104 pins which are arranged in Top and Bottom rows. The pin map is shown in Table below. The detailed description of the Bottom row ranges from pin 1 through pin 52 and is shown below. The pin orientation is shown below:

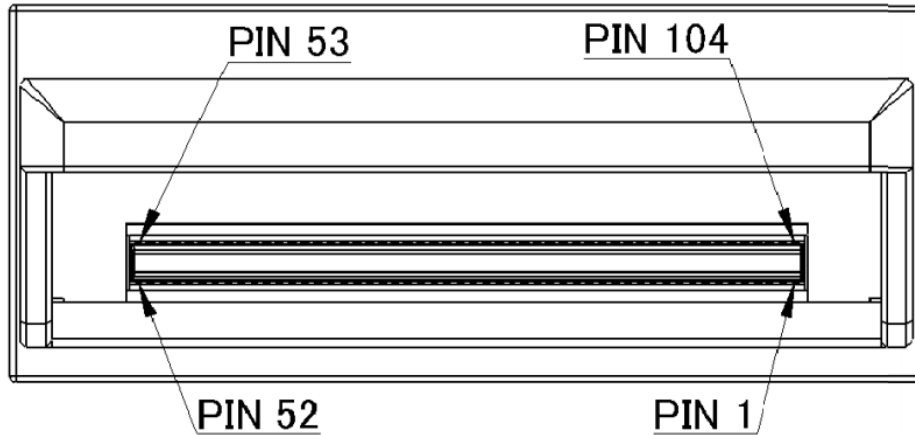


Figure2. CFP2 Pin Map Orientation

Bottom Row Pin Function Definition

PIN	Name	I/O	Logic	Description
1	GND			
2	TX_MCLKn			Supported.
3	TX_MCLKp			Supported.
4	GND			
5	N.C.			
6	N.C.			
7	3.3V_GND			3.3V Module Supply Voltage Return Ground, internally connected to Signal Ground
8	3.3V_GND			3.3V Module Supply Voltage Return Ground, internally connected to Signal Ground
9	3.3V			3.3V Module Supply Voltage
10	3.3V			3.3V Module Supply Voltage
11	3.3V			3.3V Module Supply Voltage
12	3.3V			3.3V Module Supply Voltage
13	3.3V_GND			3.3V Module Supply Voltage Return Ground, internally connected to Signal Ground
14	3.3V_GND			3.3V Module Supply Voltage Return Ground, internally connected to Signal Ground
15	VND_IO_A	I/O		Module Vendor I/O A. Do Not Connect!
16	VND_IO_B	I/O		Module Vendor I/O B. Do Not Connect!
17	PRG_CNTL1	I	LVC MOS w/ PUR	Programmable Control 1 set over MDIO

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18	PRG_CNTL2	I	LVC MOS w/ PUR	Programmable Control 2 set over MDIO
19	PRG_CNTL3	I	LVC MOS w/ PUR	Programmable Control 3 set over MDIO
20	PRG_ALARM1	O	LVC MOS	Programmable Alarm 1 set over MDIO
21	PRG_ALARM2	O	LVC MOS	Programmable Alarm 2 set over MDIO
22	PRG_ALARM3	O	LVC MOS	Programmable Alarm 3 set over MDIO
23	GND			
24	TX_DIS	I	LVC MOS w/ PUR	Transmitter Disable for all lanes, "1" or NC = transmitter disabled, "0" = transmitter enabled
25	RX_LOS	O	LVC MOS	Receiver Loss of Optical Signal, "1": low optical signal, "0": normal condition
26	MOD_LOPWR	I	LVC MOS w/ PUR	Module Low Power Mode. "1" or NC: module in low power (safe) mode, "0": power-on enabled
27	MOD_ABS	O	GND	Module Absent. "1" or NC: module absent, "0": module present, Pull Up Resistor on Host
28	MOD_RSTn	I	LVC MOS w/ PDR	Module Reset. "0" resets the module, "1" or NC = module enabled, Pull Down Resistor in Module
29	GLB_ALRMn	O	LVC MOS	Global Alarm. "0": alarm condition in any MDIO Alarm register, "1": no alarm condition, Open Drain, Pull Up Resistor on Host
30	GND			
31	MDC	I/O	1.2V CMOS	Management Data I/O bi-directional data (electrical specs as per 802.3ae and ba)
32	MDIO	I	1.2V CMOS	Management Data Clock (electrical specs as per 802.3ae and ba)
33	PRTADR0	I	1.2V CMOS	MDIO Physical Port address bit 0
34	PRTADR1	I	1.2V CMOS	MDIO Physical Port address bit 1
35	PRTADR2	I	1.2V CMOS	MDIO Physical Port address bit 2
36	VND_IO_C	I/O		Module Vendor I/O C. Do Not Connect!
37	VND_IO_D	I/O		Module Vendor I/O D. Do Not Connect!
38	VND_IO_E	I/O		Module Vendor I/O E. Do Not Connect!
39	3.3V_GND			3.3V Module Supply Voltage Return Ground, internally connected to Signal Ground
40	3.3V_GND			3.3V Module Supply Voltage Return Ground, internally connected to Signal Ground
41	3.3V			3.3V Module Supply Voltage
42	3.3V			3.3V Module Supply Voltage
43	3.3V			3.3V Module Supply Voltage
44	3.3V			3.3V Module Supply Voltage
45	3.3V_GND			3.3V Module Supply Voltage Return Ground, internally connected to Signal Ground
46	GND			
47	N.C.			
48	N.C.			
49	GND			
50	RX_MCLKn			Supported.
51	RX_MCLKp			Supported.
52	GND			

Mechanical Dimensions

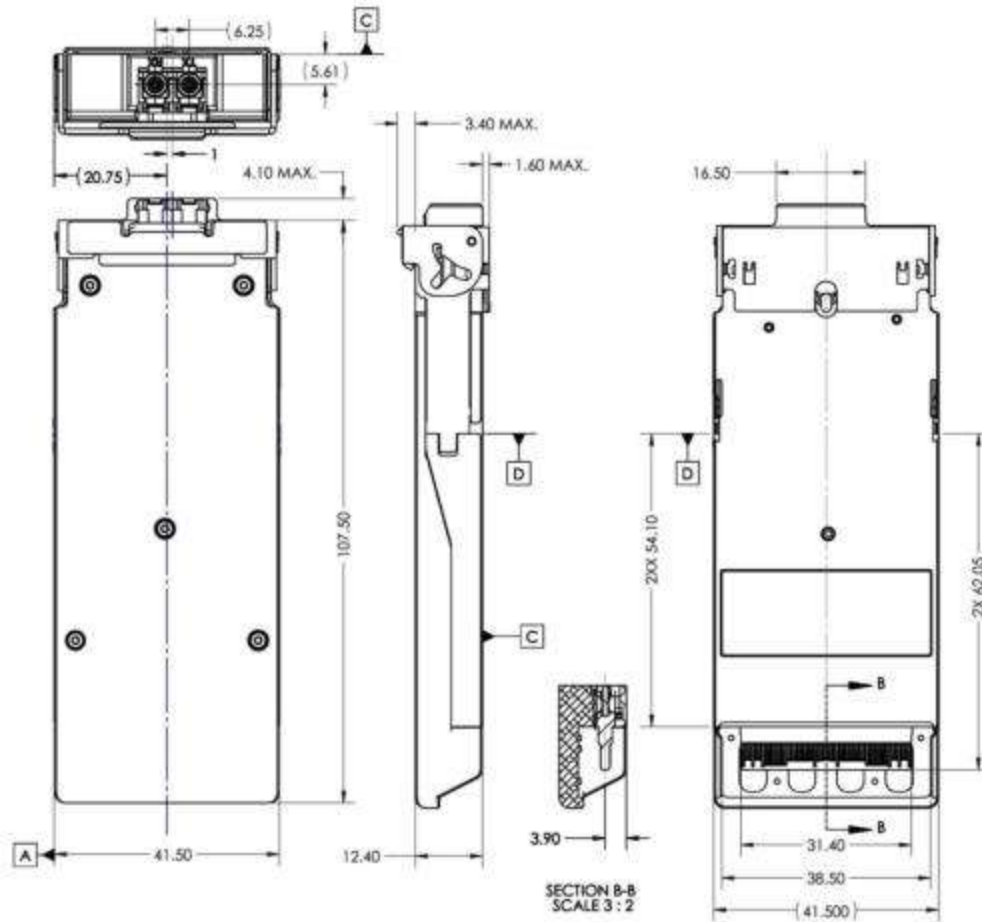


Figure3. Mechanical Specifications

References

1. CFP2 Hardware Specification and CFP MSA Management Interface Specifications (MIS), Rev 2.2.; CFP MSA.
2. Compliant to IEEE 802.3ba specification for 100GBASE-LR4
3. IEEE P802.3bm, CAUI-4 Interface.
4. OIF CEI-28G-VSR Interface

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