

# CFP2-100G-ER4

100Gbps CFP2 Transceiver, Single Mode, 40km Reach



## Product Features

- ❖ Supports multi-rate (100GBASE 100GE and OTU4); from 103.1Gb/s to 111.8Gb/s aggregate;
- ❖ Lane bit rate 25.78 Gb/s 100GE, 27.95 Gb/s OTU4;
- ❖ Up to 40km transmission on SMF;
- ❖ LAN WDM EML laser and PIN receiver with SOA;
- ❖ High speed I/O electrical interface (CAUI-4);
- ❖ MDIO interface with integrated Digital Diagnostic monitoring;
- ❖ CFP2 MSA package with duplex LC connector;

- ❖ Single +3.3V power supply;
- ❖ Maximum power consumption 9W;
- ❖ Operating case temperature: -5 to +70 ° C;
- ❖ Complies with IEEE802.3bm and ITU-T G.959;
- ❖ Complies with EU Directive 2011/65/EU (RoHS 6/6)

## Applications

- ❖ 100GBASE-ER4;

## Absolute Maximum Ratings

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Storage Temperature	T <sub>s</sub>	-40	-	+85	°C	
Supply Voltage	V <sub>CC</sub>	-0.5	-	+4.0	V	
Operating Relative Humidity	RH	-	-	+85	%	

## Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	T <sub>C</sub>	-5	-	+70	°C	
Power Supply Voltage	V <sub>CC</sub>	3.13	3.3	3.47	V	
Power Supply Current	I <sub>CC</sub>	-	-	5	A	
Maximum Power Dissipation	P <sub>D</sub>	-	-	16	W	
Aggregate Bit Rate	BR <sub>AVE</sub>	-	103.125	-	Gb/s	
Lane Bit Rate	BR <sub>LANE</sub>	-	25.78	-	Gb/s	
Transmission Distance	TD		-	40	km	Over SMF

## Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
<b>Transmitter</b>						
Center Wavelength Lane 0	$\lambda_0$	1294.53	1295.56	1296.59	nm	
Center Wavelength Lane 1	$\lambda_1$	1299.02	1300.05	1301.09	nm	
Center Wavelength Lane 2	$\lambda_2$	1303.54	1304.58	1305.63	nm	
Center Wavelength Lane 3	$\lambda_3$	1308.09	1309.14	1310.19	nm	
Total Launch Power, 100GE	P <sub>ALL</sub>	-	-	8.9	dBm	1
Average Launch Power per Lane, 100GE	P <sub>TX_LANE</sub>	-2.9	-	2.9	dBm	1
OMA per Lane, 100GE	OMA	0.1	-	4.5	dBm	1
OMA-TDP per Lane, 100GE	OMA_TDP	-	-	-	dBm	
Difference in launch power between lanes	P <sub>TX_DELTA_LANE</sub>	-	-	3.6	dB	
Total Launch Output Power, OTU4	P <sub>ALL</sub>	-	-	8.9	dBm	1
Average Launch Power per Lane, OTU4	P <sub>TX_LANE</sub>	-2.9	-	2.9	dBm	1
Average Output Power (Laser Turn off)	P <sub>OUT-OFF</sub>	-	-	-30	dBm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Extinction Ratio, 100GE	ER	8	-	-	dB	
Transmitter and Dispersion Penalty	TDP	-	-	3.5	dB	2
Optical Return Loss Tolerance	ORLT	-	-	20	dB	
Optical Eye Mask, 100GE	Compliant with IEEE 802.3ba					2
Optical Eye Mask, OTU4	Compliant with ITU-T G.959.1					2
<b>Receiver</b>						
Center Wavelength Lane 0	$\lambda_0$	1294.53	1295.56	1296.59	nm	
Center Wavelength Lane 1	$\lambda_1$	1299.02	1300.05	1301.09	nm	
Center Wavelength Lane 2	$\lambda_2$	1303.54	1304.58	1305.63	nm	
Center Wavelength Lane 3	$\lambda_3$	1308.09	1309.14	1310.19	nm	
Average Rx Power per Lane, 100GE	P <sub>RX_LANE</sub>	-20.9		4.5	dBm	3

OMA Sensitivity per Lane, 100GE	P <sub>OMA_LANE</sub>	-	-	-21.4	dBm	3
Average Rx Power per Lane, OTU4	P <sub>RX_AVE_LANE</sub>	-20.7		4.5	dBm	
Sensitivity per Lane, OTU4	P <sub>RX_AVE_LANE</sub>	-	-	-23.2	dBm	4
Receiver Overload	P <sub>IN-OL</sub>	4.5	-	-	dBm	
Reflectance	Ref	-	-	-26	dB	
LOS Assert per lane	LOS <sub>A</sub>	-40	-	-	dBm	
LOS De-assert	LOS <sub>D</sub>	-	-	-26	dBm	
LOS Hysteresis	LOS <sub>H</sub>	0.5	-	6	dB	

**Notes:**

1. The optical power is launched into SMF.
2. Measured with a PRBS 2<sup>31</sup>-1 test pattern @25.78125/27.952 Gb/s, Hit ratio≤5E-5.
3. Measured with a PRBS 2<sup>31</sup>-1 test pattern @25.78125 Gb/s, BER≤1E-12.
4. Measured with a PRBS 2<sup>31</sup>-1 test pattern @27.952 Gb/s, BER≤1E-12(with FEC).

## Electrical Characteristics

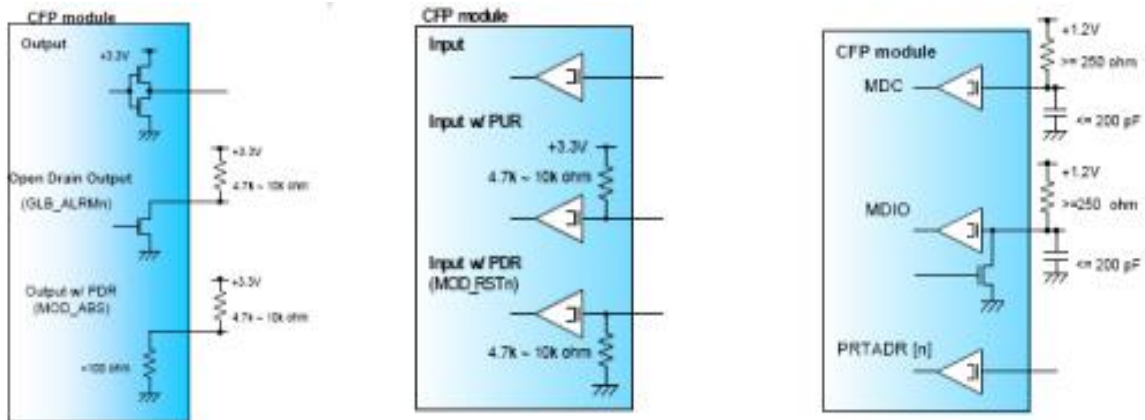


Parameter	Symbol	Min	Typical	Max	Unit	Note
<b>Transmitter (Module Input)</b>						
Differential Data Input Amplitude	$V_{IN,P-P}$	85	-	900	mVpp	
Differential Termination Mismatch		-	-	10	%	
Tx_Disable	Normal Operation	$V_{IL}$	-0.3	-	0.8	V
	Laser Disable	$V_{IH}$	2.0	-	$V_{CC}+0.3$	V
<b>Receiver (Module Input)</b>						
Differential Data Output Amplitude	$V_{OUT,P-P}$	200	-	900	mVpp	
Differential Termination Mismatch (1MHZ)		-	-	10	%	
Output Rise/Fall Time, 20%~80%	$T_R$	12	-	-	ps	
Rx_LOS	Normal Operation	$V_{OL}$	-	-	0.2	V
	Lose Signal	$V_{OH}$	$V_{CC}-0.2$	-	-	V

## Digital Diagnostics

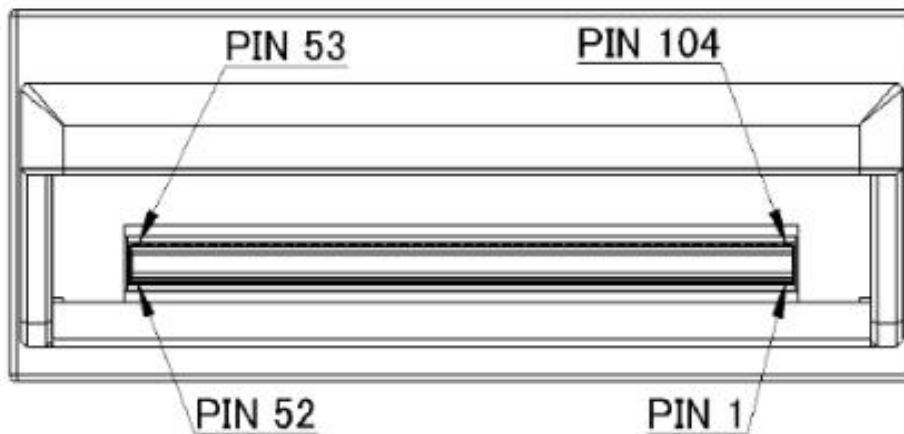
Parameter	Range	Unit	Accuracy	Calibration
Temperature	-5 to 70	°C	±3	Internal
Voltage	0 to $V_{CC}$	V	0.1	Internal
Tx Bias Current Per Lane	0 to 100	mA	10%	Internal
SOA Bias Current	0 to 130	mA	10%	Internal
Tx Output Power Per Lane	-3 to 3	dBm	±3	Internal
Rx Power (Each Lane)	-25 to 5	dBm	±3	Internal

## Hardware Signal Pin Electrical Specification



**Note:** The MSA recommends host termination resistor value of 560 Ohms, which provides the best balance of performance for both open-drain and active tri-state driver in the module.

## Pin Definition

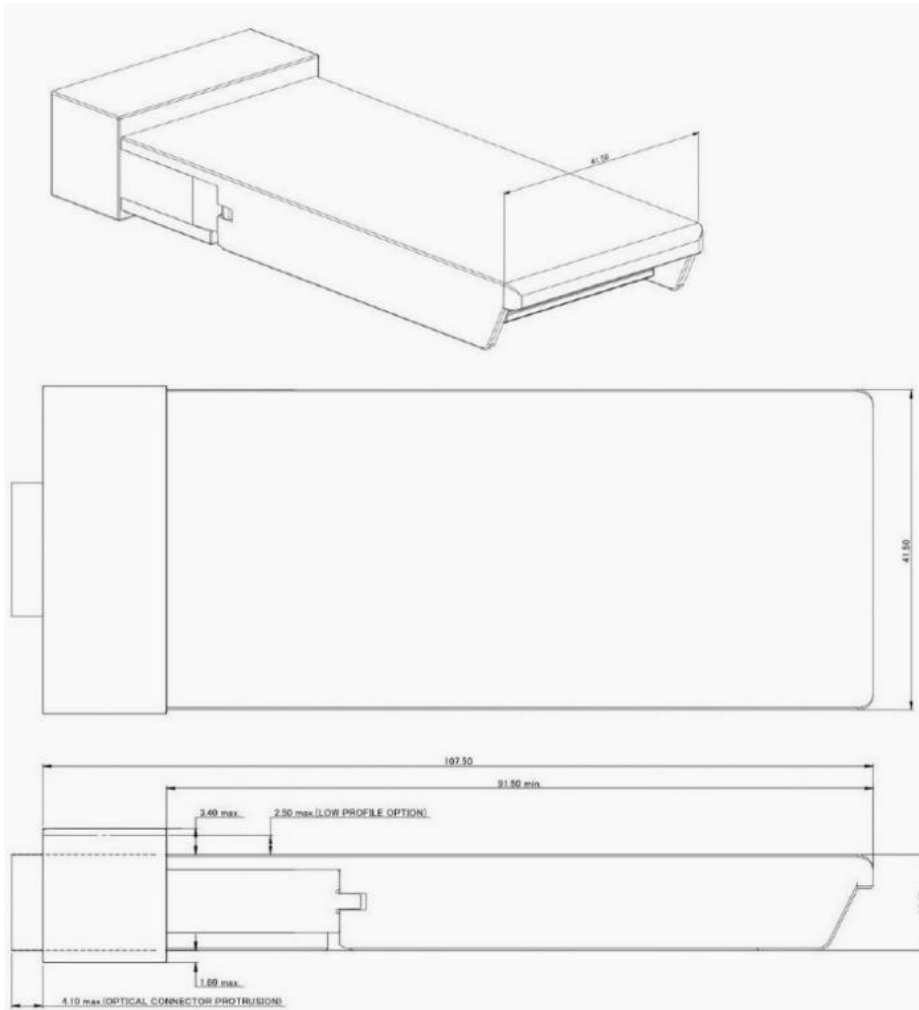


Bottom (Nx25G)	
1	GND
2	(TX_MCLKn)
3	(TX_MCLKp)
4	GND
5	N.C.
6	N.C.
7	3.3V_GND
8	3.3V_GND
9	3.3V
10	3.3V
11	3.3V
12	3.3V
13	3.3V_GND
14	3.3V_GND
15	VND_IO_A
16	VND_IO_B
17	PRG_CNTL1
18	PRG_CNTL2
19	PRG_CNTL3
20	PRG_ALARM1
21	PRG_ALARM2
22	PRG_ALARM3
23	GND
24	TX_DIS
25	RX_LOS
26	MOD_LOPWR
27	MOD_ABS
28	MOD_RSTn
29	GLB_ALARMn
30	GND
31	MDC
32	MDIO
33	PRTADR0
34	PRTADR1
35	PRTADR2
36	VND_IO_C
37	VND_IO_D
38	VND_IO_E
39	3.3V_GND
40	3.3V_GND
41	3.3V
42	3.3V
43	3.3V
44	3.3V
45	3.3V_GND
46	3.3V_GND
47	N.C.
48	N.C.
49	GND
50	(RX_MCLKn)
51	(RX_MCLKp)
52	GND

Top (4x25G)	
104	GND
103	N.C.
102	N.C.
101	GND
100	TX3n
99	TX3p
98	GND
97	TX2n
96	TX2p
95	GND
94	N.C.
93	N.C.
92	GND
91	N.C.
90	N.C.
89	GND
88	TX1n
87	TX1p
86	GND
85	TX0n
84	TX0p
83	GND
82	N.C.
81	N.C.
80	GND
79	(REFCLKn)
78	(REFCLKp)
77	GND
76	N.C.
75	N.C.
74	GND
73	RX3n
72	RX3p
71	GND
70	RX2n
69	RX2p
68	GND
67	N.C.
66	N.C.
65	GND
64	N.C.
63	N.C.
62	GND
61	RX1n
60	RX1p
59	GND
58	RX0n
57	RX0p
56	GND
55	N.C.
54	N.C.
53	GND



## Mechanical Dimensions



## Ordering Information

Part Number	Product Description
CFP2-100G-ER4	100Gbps CFP2 ER4, 1310nm, LC, 40km, -5°C~+70°C, with DDM