CFP2-100G-ER4

100G CFP2 ER4 dual rate 40km Module

Features

- Supports multi-rate (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;
- LANWDM laser and PIN receiver with SOA;
- High speed I/O electrical interface (CAUI-4);
- MDIO interface with integrated Digital Diagnostic
- CFP2 MSA package with duplex LC connector;
- Single +3.3V power supply;
- Maximum power consumption 14W;
- Operating case temperature: 0 to +70 °C;
- Complies with IEEE802.3ba and ITU-T G.959.1;
- Complies with EU Directive 2015/863/EU;

Application

- 100GBASE-ER4;

Order Information

Table 1- order information

Part No.	Data Rate	Laser	Fiber Type	Distance	Optical Interface	Temp	DDMI
CFP2-100G-ER4	103.1~111.8Gbps	LWDM	SMF	40km	LC	0~70C	Y

Absolute Maximum Ratings

Table 2-Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Storage Temperature	T_S	-40	-	+85	°C	
Supply Voltage	V_{CC}	-0.5	-	+4.0	V	
Operating Relative Humidity	RH	-	-	+85	%	

Recommended Operating Conditions

Table 3-Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	T_C	0	-	+70	°C	

Power Supply Voltage	V_{CC}	3.13	3.3	3.47	V	
Maximum Power Dissipation	PD	-	-	14	W	
Aggregate Bit Rate	BR_{AVE}	-	103.125	111.8	Gb/s	
Lane Bit Rate	BR_{LANE}	-	25.78	27.95	Gb/s	
Transmission Distance	TD		-	40	km	Over SMF

Optical Characteristics

Table 4-Optical Characteristics

Transmitter						
Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Center Wavelength Lane 0	λ_0	1294.53	1295.56	1296.59	nm	
Center Wavelength Lane 1	λ_1	1299.02	1300.05	1301.09	nm	
Center Wavelength Lane 2	λ_2	1303.54	1304.58	1305.63	nm	
Center Wavelength Lane 3	λ_3	1308.09	1309.14	1310.19	nm	
Total Launch Power, 100GE	P_{ALL}	-	-	8.9	dBm	1
Average Launch Power per Lane, 100GE	P_{TX_LANE}	-2.9	-	2.9	dBm	1
OMA per Lane, 100GE	OMA	0.1	-	4.5	dBm	
Difference in launch power between lanes	$P_{TX\_DELTA\_LANE}$	-	-	3.6	dB	
Total Launch Output Power, OTU4	P_{ALL}	-	-	8.9	dBm	1
Average Launch Power per Lane, OTU4	P_{TX_LANE}	-2.7	-	2.9	dBm	1
Average Output Power (Laser Turn off)	$P_{OUT-OFF}$	-	-	-30	dBm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Extinction Ratio, 100GE/ OTU4	ER	8	-	-	dB	
Optical Eye Mask, 100GE	Compliant with IEEE 802.3ba					2
Optical Eye Mask, OTU4	Compliant with ITU-T G.959.1					2
Receiver						
Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Center Wavelength Lane 0	λ_0	1294.53	1295.56	1296.59	nm	
Center Wavelength Lane 1	λ_1	1299.02	1300.05	1301.09	nm	
Center Wavelength Lane 2	λ_2	1303.54	1304.58	1305.63	nm	
Center Wavelength Lane 3	λ_3	1308.09	1309.14	1310.19	nm	
Average Rx Power per Lane, 100GE	P_{RX_LANE}	-20.9		4.5	dBm	
OMA Sensitivity per Lane, 100GE	P_{OMA_LANE}	-	-	-20.4	dBm	3
Average Rx Power per Lane, OTU4	$P_{RX\_AVE\_LANE}$	-20.7		4.5	dBm	
Sensitivity per Lane, OTU4	$P_{RX\_AVE\_LANE}$	-	-	-22.2	dBm	4
Receiver Damage	P_{damage}	5.5	-	-	dBm	

Notes:

1. The optical power is launched into SMF.

2. Measured with a PRBS 2^{31}-1 test pattern @25.78125/27.952 Gb/s, Hit ratio≤5E-5.
3. Measured with a PRBS 2^{31}-1 test pattern @25.78125 Gb/s, BER≤1E-12.
4. Measured with a PRBS 2^{31}-1 test pattern @27.952 Gb/s, BER≤5E-5 pre FEC.

Electrical Characteristics

High-Speed Signal: Compliant to CAUI-4 (IEEE 802.3bm)

Low-Speed Signal: Compliant to CFP2 MSA Hardware Specification

Table 5-Electrical Characteristics

Transmitter (Module Input)						
Parameter		Symbol	Min.	Typical	Max.	Unit	Notes
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	
Receiver (Module Output)						
Parameter		Symbol	Min.	Typical	Max.	Unit	Notes
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

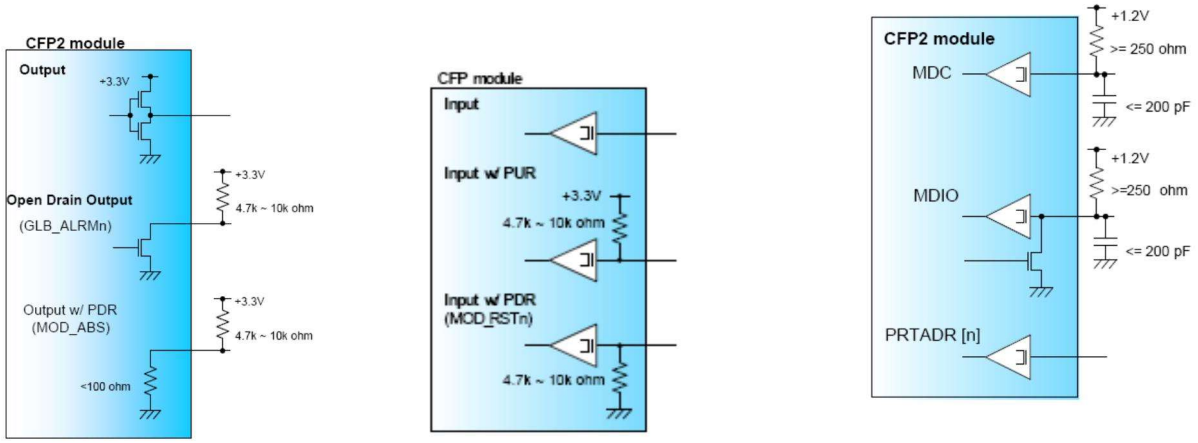
Table 6-Digital Diagnostics

Parameter	Range	Accuracy	Unit	Calibration
Temperature	-5 to 70	±3	ºC	Internal
Voltage	0 to VCC	±3%	V	Internal
Tx Bias Current Per Lane	0 to 100	±10%	mA	Internal
Tx Output Power Per Lane	-2.9 to 2.9	±3	dB	Internal
Rx Power (Each Lane)	-20.9 to 4.5	±3	dB	Internal

Hardware Signal Pin Electrical Specification

Table 7-Reference 3.3V LVCOMS output/input termination

Reference MDIO Interface Termination



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 Definitions

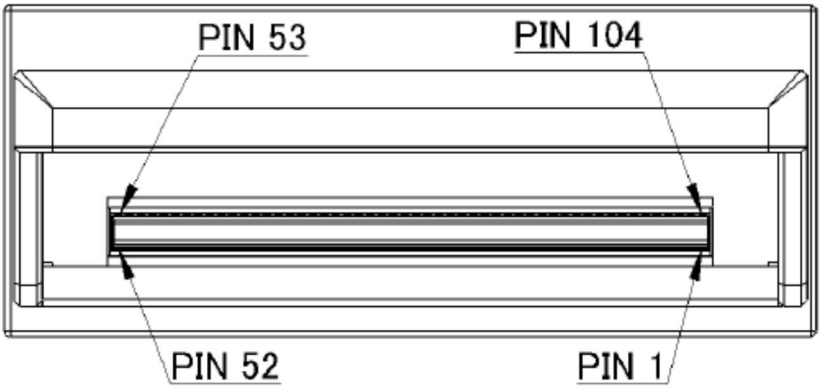
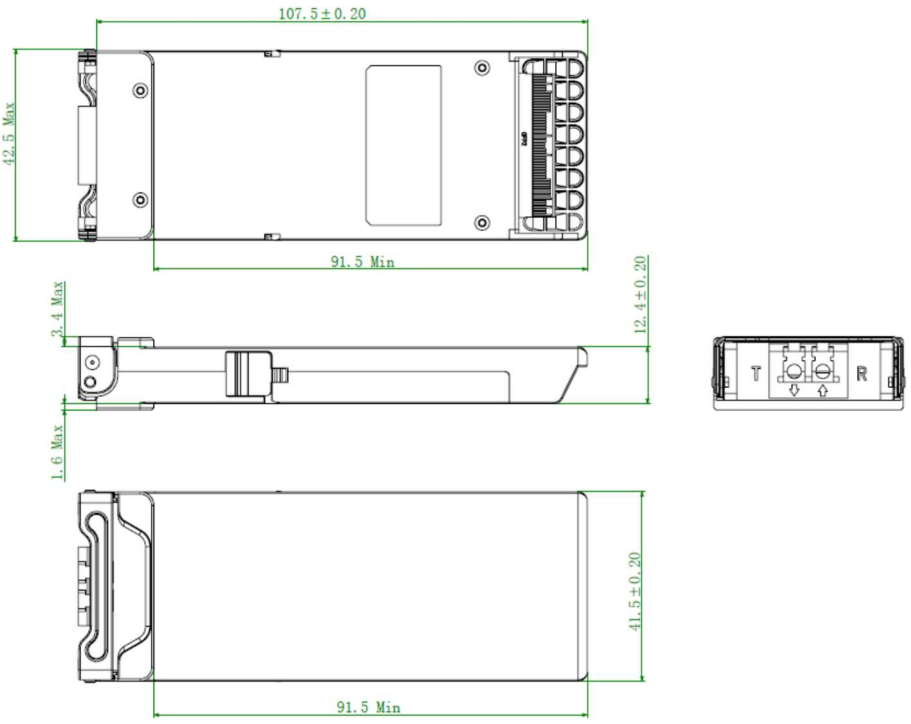


Table 8-Electrical Characteristics

	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_ALRM1
21	PRG_ALRM2
22	PRG_ALRM3
23	GND
24	TX_DIS
25	RX_LOS
26	MOD_LOPWR
27	MOD_ABS
28	MOD_RSTn
29	GLB_ALRMn
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 Dimension



Warnings

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.