

TS-C2-311H-10DC

100G CFP2 LR4-Dual Rate

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 10km transmission on SMF;
- LAN WDM DML laser and PIN receiver;
- 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 2015/863/EU (RoHS 6/6).

Application

- 100GBASE-LR4;

Order Information

Table 1- order information

Part No.	Data Rate	Laser	Fiber Type	Distance	Optical Interface	Temp	DDMI
TS-C2-311H-10DC	103.1Gbps 111.8Gbps	1310nm DML	SMF	10km	LC	-5~70C	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	-5	-	+70	°C	
Power Supply Voltage	V _{cc}	3.13	3.3	3.47	V	
Power Supply Current	I _{cc}	-	-	2.5	A	

Maximum Power Dissipation	P _D	-	-	9	W	
Aggregate Bit Rate	BR _{AVE}	-	103.125	-	Gb/s	
Lane Bit Rate	BR _{LANE}	-	25.78	-	Gb/s	
Transmission Distance	TD		-	10	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}	-	-	10.5	dBm	1
Average Launch Power per Lane, 100GE	P _{TX_LANE}	-4.3	-	4.5	dBm	1
OMA per Lane, 100GE	OMA	-1.3	-	4.5	dBm	1
OMA-TDP per Lane, 100GE	OMA_TDP	-2.3	-	-	dBm	
Difference in launch power between lanes	P _{TX_DELTA_LANE}	-	-	3.6	dB	
Total Launch Output Power, OTU4	P _{ALL}	--	--	10	dBm	1
Average Launch Power per Lane, OTU4	P _{TX_LANE}	-0.6	-	4	dBm	1
Average Output Power (Laser Turn off)	P _{OUT-OFF}	-	-	-40	dBm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Extinction Ratio, 100GE	ER1	4	-	-	dB	
Extinction Ratio, OTU4	ER2	4	-	6.5	dB	
Transmitter and Dispersion Penalty	TDP	-	-	2.2	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
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	
Damage threshold	P _{damage}	5.5	-	-	dBm	
Average Rx Power per Lane, 100GE	P _{RX_LANE}	-10.6	-	4.5	dBm	3
OMA Sensitivity per Lane, 100GE	P _{OMA_LANE}	-	-	-8.6	dBm	3
Average Rx Power per Lane, OTU4	P _{RX_AVE_LANE}	-6.9	-	4	dBm	4
Average Rx Power per Lane, OTU4	P _{RX_AVE_LANE}	-8.8	-	2.9	dBm	4,5
Sensitivity per Lane, OTU4	P _{RX_OMA_LANE}	-	-	-10.3	dBm	4
Sensitivity per Lane, OTU4	P _{RX_OMA_LANE}	-	-	-8.4	dBm	4,5
Reflectance	Ref	-	-	-26	dB	
LOS Assert per lane	LOS _A	-20	-	-	dBm	
LOS De-assert	LOS _D	-	-	-12	dBm	
LOS Hysteresis	LOS _H	0.5	-	4.0	dB	

1. The optical power is launched into SMF.
2. Measured with a PRBS 2³¹-1 test pattern @25.78125/27.952 Gb/s, Hit ratio≤5E-5.
3. Measured with a PRBS 2³¹-1 test pattern @25.78125 Gb/s, BER≤1E-12.
4. Measured with a PRBS 2³¹-1 test pattern @27.952 Gb/s, BER≤1E-12(with FEC), BER≤1E-6(Pre-FEC).
5. Measured with a reference ER>7dB.

Electrical Characteristics

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

Low-Speed Signal: Compliant to CFP2 MSA Hardware Specification v 1.0

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

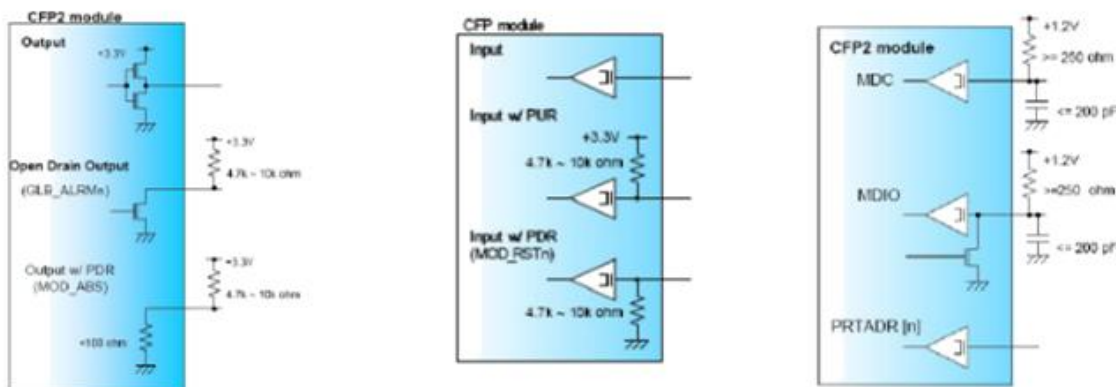
Table 6-Digital Diagnostics

Parameter	Range	Accuracy	Unit	Calibration
Temperature	-5 to 70	± 3	$^{\circ}\text{C}$	Internal
Voltage	0 to V_{CC}	0.1	V	Internal
Tx Bias Current Per Lane	0 to 100	10%	mA	Internal
Tx Output Power Per Lane	-4.5 to 5	± 2	dBm	Internal
Rx Power (Each Lane)	-15 to 5	± 2	dBm	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

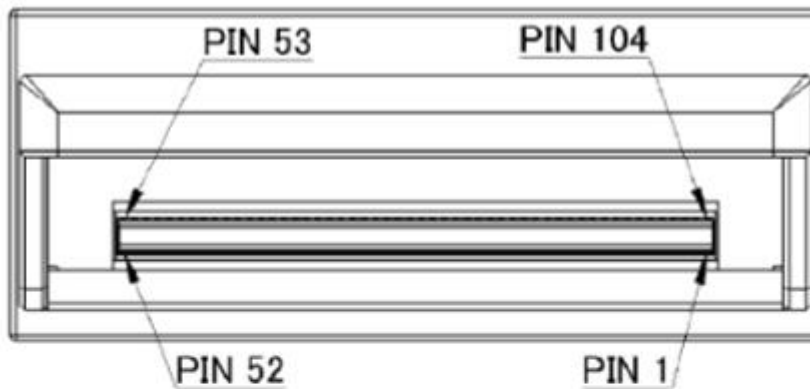
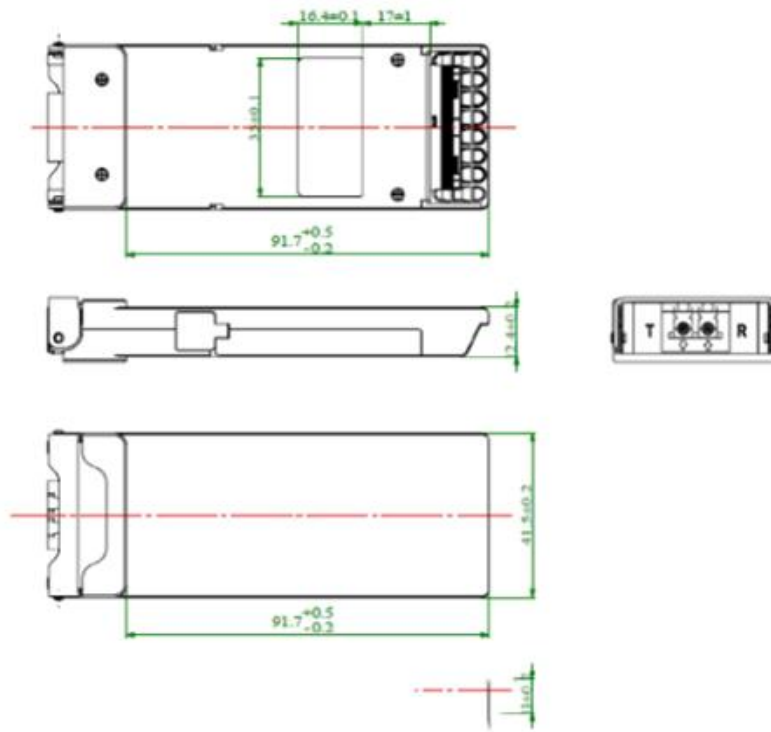


Table 8-Electrical Characteristics

Bottom (Nx25G)		Top (4x25G)	
1	GND	104	GND
2	(TX_MCLKn)	103	N.C.
3	(TX_MCLKp)	102	N.C.
4	GND	101	GND
5	N.C.	100	TX3n
6	N.C.	99	TX3p
7	3.3V_GND	98	GND
8	3.3V_GND	97	TX2n
9	3.3V	96	TX2p
10	3.3V	95	GND
11	3.3V	94	N.C.
12	3.3V	93	N.C.
13	3.3V_GND	92	GND
14	3.3V_GND	91	N.C.
15	VND_IO_A	90	N.C.
16	VND_IO_B	89	GND
17	PRG_CNTL1	88	TX1n
18	PRG_CNTL2	87	TX1p
19	PRG_CNTL3	86	GND
20	PRG_ALARM1	85	TX0n
21	PRG_ALARM2	84	TX0p
22	PRG_ALARM3	83	GND
23	GND	82	N.C.
24	TX_DIS	81	N.C.
25	RX_LOS	80	GND
26	MOD_LOPWR	79	(REFCLKn)
27	MOD_ABS	78	(REFCLKp)
28	MOD_RSTn	77	GND
29	GLB_ALRMn	76	N.C.
30	GND	75	N.C.
31	MDC	74	GND
32	MDIO	73	RX3n
33	PRTADR0	72	RX3p
34	PRTADR1	71	GND
35	PRTADR2	70	RX2n
36	VND_IO_C	69	RX2p
37	VND_IO_D	68	GND
38	VND_IO_E	67	N.C.
39	3.3V_GND	66	N.C.
40	3.3V_GND	65	GND
41	3.3V	64	N.C.
42	3.3V	63	N.C.
43	3.3V	62	GND
44	3.3V	61	RX1n
45	3.3V_GND	60	RX1p
46	3.3V_GND	59	GND
47	N.C.	58	RX0n
48	N.C.	57	RX0p
49	GND	56	GND
50	(RX_MCLKn)	55	N.C.
51	(RX_MCLKp)	54	N.C.
52	GND	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.