

TS-CF-311H-10DC

100G CFP 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 laser and PIN receiver
- High speed I/O electrical interface (CAUI-10)
- MDIO interface with integrated Digital Diagnostic monitoring
- CFP MSA package with duplex LC connector
- Single +3.3V power supply
- Maximum power consumption 10W
- Operating case temperature: -5 to +70 °C
- Complies with IEEE802.3ba and ITU-T G.959
- Complies with EU Directive 2015/865/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-CF-311H-10DC	103.1Gbps 111.8Gbps	LWDM	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}	-	-	2.9	A	
Maximum Power Dissipation	P_D	-	-	10	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
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	
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

LOS Assert per lane	LOS _A	-20	-	-	dBm	
LOS De-assert	LOS _D	-	-	-12	dBm	
LOS Hysteresis	LOS _H	0.5	-	4.0	dB	

Notes:

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-10 (IEEE 802.3ba)

Low-Speed Signal: Compliant to CFP MSA Hardware Specification v 1.4

Table 5-Electrical Characteristics

Transmitter (Module Input)						
Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Differential Data Input Amplitude	V _{IN,P-P}	85	-	850	mVpp	
Differential Termination Mismatch		-	-	5	%	
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	-	760	mVpp	
Differential Termination Mismatch (1MHZ)		-	-	5	%	
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

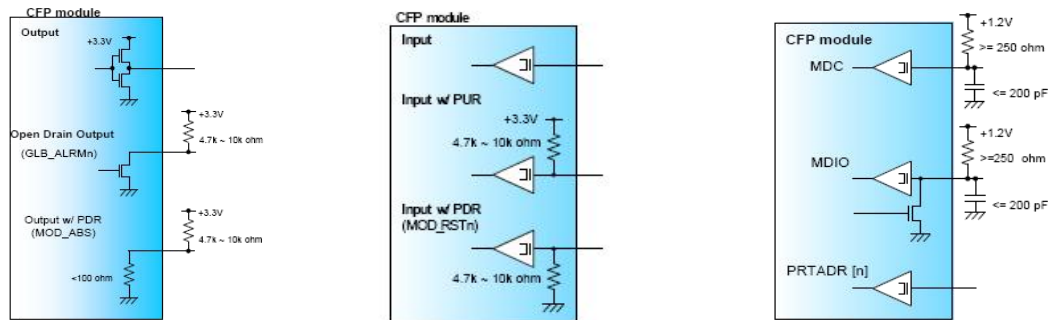
Table 6-Digital Diagnostics

Parameter	Range	Accuracy	Unit	Calibration
Temperature	-5 to 70	±3	°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	-4.3 to 7.5	±2	dBm	Internal
Rx Input Power Per Lane	-11 to 5.5	±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

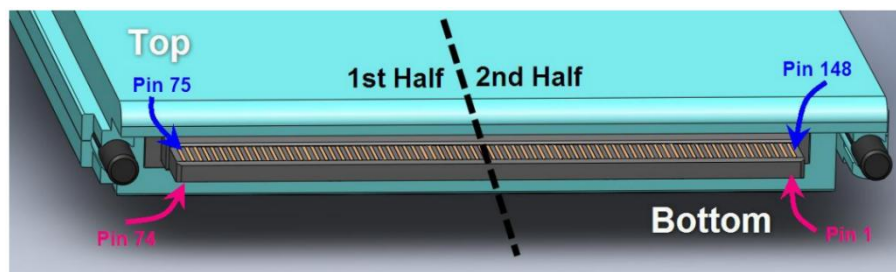
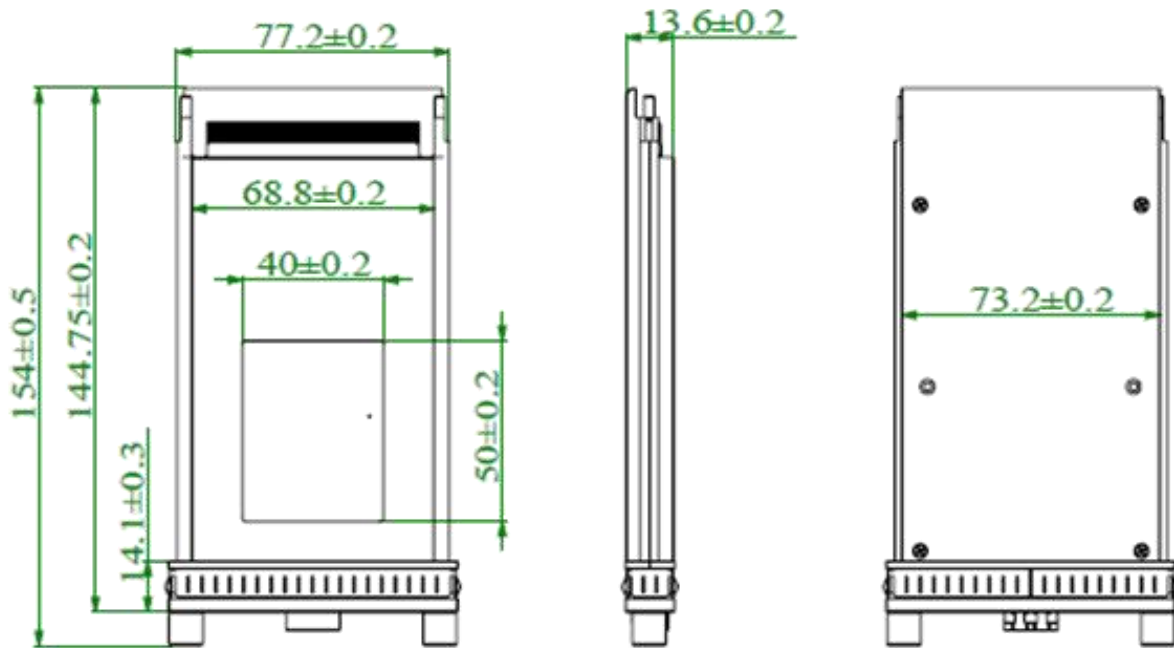


Table 8-Electrical Characteristics

Top Row (2nd Half)		Bottom Row (2nd Half)		Top Row (1st Half)		Bottom Row (1st Half)	
148	GND	1	3.3V_GND	111	GND	38	MOD_ABS
147	REFCLKn	2	3.3V_GND	110	N.C.	39	MOD_RSTn
146	REFCLKp	3	3.3V_GND	109	N.C.	40	RX_LOS
145	GND	4	3.3V_GND	108	GND	41	GLB_ALRMn
144	N.C.	5	3.3V_GND	107	RX9n	42	PRTADR4
143	N.C.	6	3.3V	106	RX9p	43	PRTADR3
142	GND	7	3.3V	105	GND	44	PRTADR2
141	TX9n	8	3.3V	104	RX8n	45	PRTADR1
140	TX9p	9	3.3V	103	RX8p	46	PRTADR0
139	GND	10	3.3V	102	GND	47	MDIO
138	TX8n	11	3.3V	101	RX7n	48	MDC
137	TX8p	12	3.3V	100	RX7p	49	GND
136	GND	13	3.3V	99	GND	50	VND_IO_F
135	TX7n	14	3.3V	98	RX6n	51	VND_IO_G
134	TX7p	15	3.3V	97	RX6p	52	GND
133	GND	16	3.3V_GND	96	GND	53	VND_IO_H
132	TX6n	17	3.3V_GND	95	RX5n	54	VND_IO_J
131	TX6p	18	3.3V_GND	94	RX5p	55	3.3V_GND
130	GND	19	3.3V_GND	93	GND	56	3.3V_GND
129	TX5n	20	3.3V_GND	92	RX4n	57	3.3V_GND
128	TX5p	21	VND_IO_A	91	RX4p	58	3.3V_GND
127	GND	22	VND_IO_B	90	GND	59	3.3V_GND
126	TX4n	23	GND	89	RX3n	60	3.3V
125	TX4p	24	(TX_MCLKn)	88	RX3p	61	3.3V
124	GND	25	(TX_MCLKp)	87	GND	62	3.3V
123	TX3n	26	GND	86	RX2n	63	3.3V
122	TX3p	27	VND_IO_C	85	RX2p	64	3.3V
121	GND	28	VND_IO_D	84	GND	65	3.3V
120	TX2n	29	VND_IO_E	83	RX1n	66	3.3V

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: Transcom transceiver uses a semiconductor laser system and is a laser class1 product acc. FDA, complies with 21CFR1040.10 and 1040.11. Also this product is a laser class1 product acc. IEC 60825-1.