CFP-100G-LR4

100G CFP LR4 Dual Rate 10km 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 10km transmission on SMF
- LANWDM 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 12W
- 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-LR4

Order Information

Table 1- order information

Part No.	Data Rate	Laser	Fiber Type	Distance	Optical Interface	Temp	DDMI
CFP-100G-LR4	103.1~111.8Gbps	LWDM	SMF	10km	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}	3.135	3.3	3.465	V	
Maximum Power Dissipation	PD	-	-	12	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		-	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
Total Launch Power, OTU4	P_{ALL}	-	-	8.9		1
Average Launch Power per Lane, 100GE	P_{TX_LANE}	-4.3	-	4.5	dBm	1
Average Launch Power per Lane, OTU4	P_{TX_LANE}	-2.5	-	2.9	dBm	1
OMA per Lane, 100GE	OMA	-1.3	-	4.5	dBm	1
OMA–TDP per Lane, 100GE	OMA_TDP	-2.3	-	-	dBm	
Extinction Ratio, 100GE	ER	4	-	-	dB	
Extinction Ratio, OTU4	ER	7	-	-	dB	
Difference in launch power between lanes	$P_{TX\_DELTA\_LANE}$	-	-	5	dB	
Average Output Power (Laser Turn off)	$P_{OUT-OFF}$	-	-	-30	dBm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Optical Eye Mask, 100GE	{0.25, 0.4, 0.45, 0.25, 0.28, 0.4} Compliant with IEEE 802.3ba					2
Optical Eye Mask, OTU4	{0.25, 0.4, 0.45, 0.25, 0.28, 0.4} 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}	-10.6		4.5	dBm	
OMA Sensitivity per Lane, 100GE	P_{OMA_LANE}	-	-	-8.6	dBm	3
Average Rx Power per Lane, OTU4	$P_{RX\_AVE\_LANE}$	-8.8		2.9	dBm	
Sensitivity per Lane, OTU4	$P_{RX\_AVE\_LANE}$	-	-	-10.3	dBm	4

Damage Threshold	Pdamage	5.5	-	-	dBm	
Receiver Reflectance	RL	-	-	-26	dB	

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-10 (IEEE 802.3ba)

Low-Speed Signal: Compliant to CFP 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	-	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

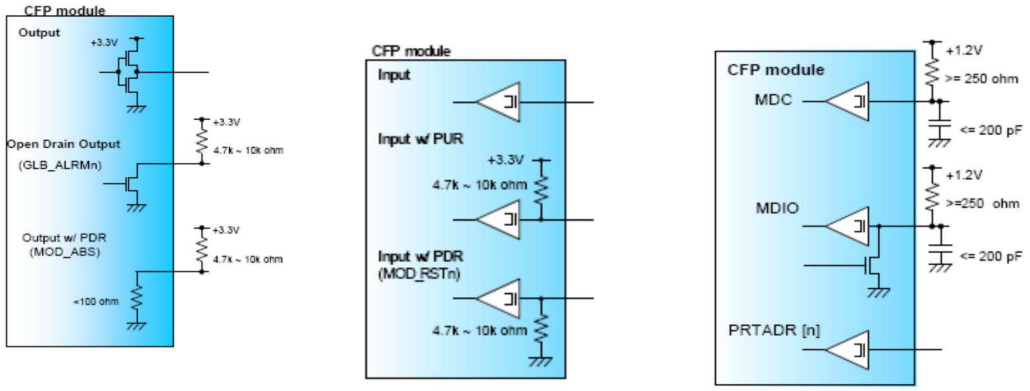
Table 6-Digital Diagnostics

Parameter	Range	Accuracy	Unit	Calibration
Temperature	0 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	-4.3 to 4.5	±3	dB	Internal
Rx Power (Each Lane)	-10.6 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

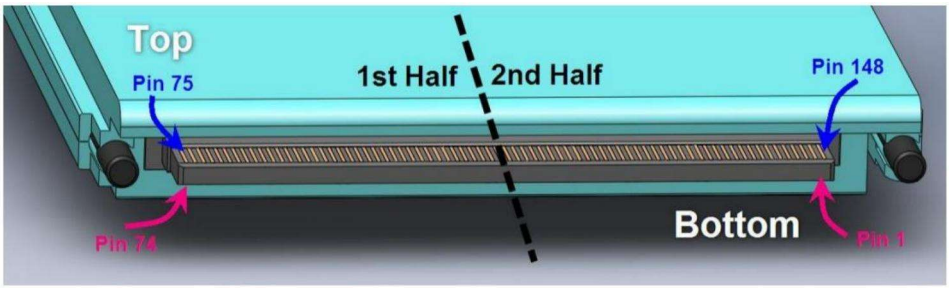
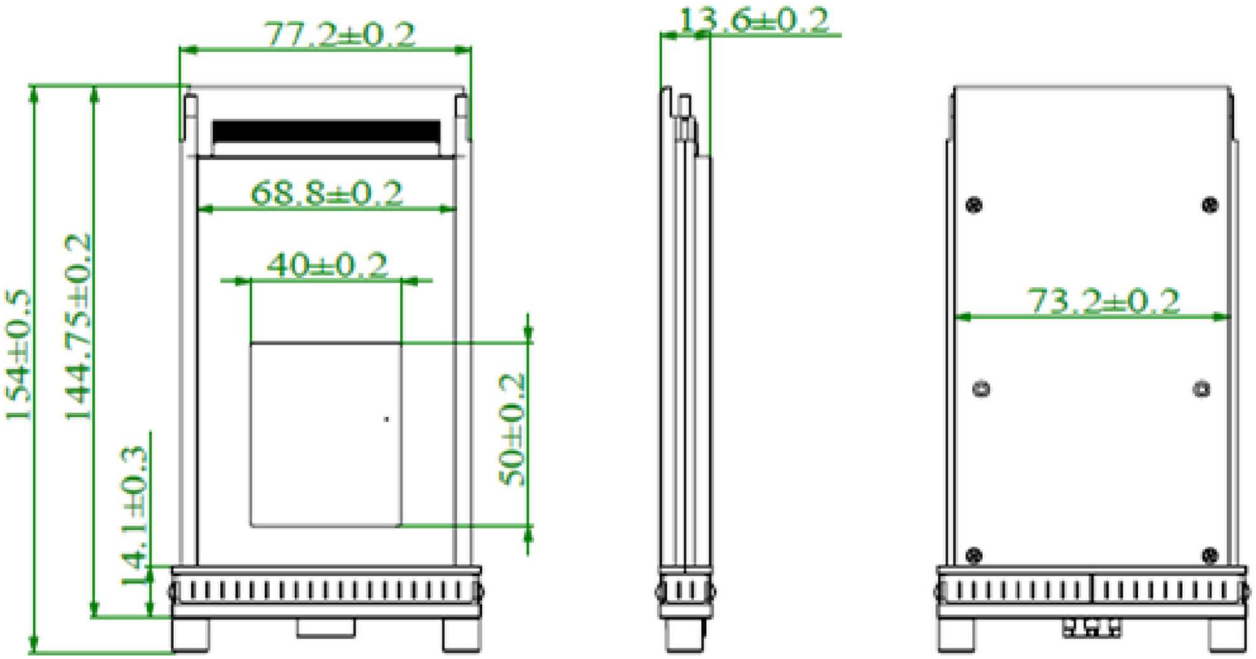


Table 8-Electrical Characteristics

	Top Row (2nd Half)		Bottom Row (2nd Half)
148	GND	1	3.3V_GND
147	REFCLKn	2	3.3V_GND
146	REFCLKp	3	3.3V_GND
145	GND	4	3.3V_GND
144	*N.C.*	5	3.3V_GND
143	*N.C.*	6	3.3V
142	GND	7	3.3V
141	TX9n	8	3.3V
140	TX9p	9	3.3V
139	GND	10	3.3V
138	TX8n	11	3.3V
137	TX8p	12	3.3V
136	GND	13	3.3V
135	TX7n	14	3.3V
134	TX7p	15	3.3V
133	GND	16	3.3V_GND
132	TX6n	17	3.3V_GND
131	TX6p	18	3.3V_GND
130	GND	19	3.3V_GND
129	TX5n	20	3.3V_GND
128	TX5p	21	VND_IO_A
127	GND	22	VND_IO_B
126	TX4n	23	GND
125	TX4p	24	*(TX_MCLKn)*
124	GND	25	*(TX_MCLKp)*
123	TX3n	26	GND
122	TX3p	27	VND_IO_C
121	GND	28	VND_IO_D
120	TX2n	29	VND_IO_E
119	TX2p	30	PRG_CNTL1
118	GND	31	PRG_CNTL2
117	TX1n	32	PRG_CNTL3
116	TX1p	33	PRG_ALRM1
115	GND	34	PRG_ALRM2
114	TX0n	35	PRG_ALRM3
113	TX0p	36	TX_DIS
112	GND	37	MOD_LOPWR

	Top Row (1st Half)		Bottom Row (1st Half)
111	GND	38	MOD_ABS
110	*N.C.*	39	MOD_RSTn
109	*N.C.*	40	RX_LOS
108	GND	41	GLB_ALRMn
107	RX9n	42	PRTADR4
106	RX9p	43	PRTADR3
105	GND	44	PRTADR2
104	RX8n	45	PRTADR1
103	RX8p	46	PRTADR0
102	GND	47	MDIO
101	RX7n	48	MDC
100	RX7p	49	GND
99	GND	50	VND_IO_F
98	RX6n	51	VND_IO_G
97	RX6p	52	GND
96	GND	53	VND_IO_H
95	RX5n	54	VND_IO_J
94	RX5p	55	3.3V_GND
93	GND	56	3.3V_GND
92	RX4n	57	3.3V_GND
91	RX4p	58	3.3V_GND
90	GND	59	3.3V_GND
89	RX3n	60	3.3V
88	RX3p	61	3.3V
87	GND	62	3.3V
86	RX2n	63	3.3V
85	RX2p	64	3.3V
84	GND	65	3.3V
83	RX1n	66	3.3V
82	RX1p	67	3.3V
81	GND	68	3.3V
80	RX0n	69	3.3V
79	RX0p	70	3.3V_GND
78	GND	71	3.3V_GND
77	*(RX_MCLKn)*	72	3.3V_GND
76	*(RX_MCLKp)*	73	3.3V_GND
75	GND	74	3.3V_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: The CFP# family 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 class 1 product acc. IEC 60825-1

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