
100Gb/s CFP2 100GBase-ER4 30km

Optical Transceiver Module

PRODUCT FEATURES

- Hot-pluggable CFP form factor
- Supports 103.1Gb/s and 112Gb/s aggregate bit rates
- Power dissipation < 12W
- RoHS-6 compliant (lead-free)
- Commercial case temperature range of 0°C to 70°C
- Single 3.3V power supply
- Maximum link length of 10km on Single Mode Fiber (SMF)
- 4x25Gb/s DFB-based LAN-WDM transmitter
- 10x10G MLD electrical interface
- Duplex LC receptacles
- MDIO management interface

APPLICATIONS

- 100GBASE-ER4 100G Ethernet
- Other Optical link

PRODUCT DESCRIPTIONS

HOLS-CFP2LW30 100GE CFP transceiver modules are designed for use in 100 Gigabit Ethernet links over single mode fiber They are compliant with the CFP MSA . Digital diagnostics functions are available via the MDIO interface, as specified by the CFP MSA.

Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Maximum Supply Voltage	Vcc	-0.5		4.0	V	
Storage Temperature	TS	-40		85	°C	

Case Operating Temperature	TOP	-5		75	°C	
Relative Humidity	RH	5		85	%	
Receiver Damage Threshold, per Lane	PRdm	5.5			dBm	

Notes:

1. Module performance is not guaranteed beyond the operating range.
2. Exceeding the limits below may damage the transceiver module permanently.

General Specifications

Parameter	Symbol	Min	Typ	Max	Units	Ref.
Bit Rate (all wavelengths)	BR		103.1		Gb/s	1
Bit Error Ratio @25.78Gb/s	BER1			10 ⁻¹²		2
Maximum Supported						
Fiber Type						
SMF per	Lmax1			30	km	

Notes:

1. Supports 100GBASE-ER4 per IEEE 802.3ba.
2. Tested with a 2³¹ - 1 PRBS.

Environmental Specifications

Parameter	Symbol	Min	Typ	Max	Units	Ref.
Case Operating Temperature	Top	0		70	°C	
Storage Temperature	Tsto	-		85	°C	

Electrical Characteristics (EOL, TOP = 0 to 70 °C, VCC = 3.2 to 3.4 Volts)

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
Supply Voltage	Vcc	3.2		3.4	V	
Supply Current	Icc			5	A	

Module total power	P			16	W	
Transmitter						
Signaling rate per lane				11.2	Gb/s	
Input differential impedance	R _{in}		100		Ω	
Differential data input swing per lane	V _{in,pp}			760	mV	
Data input rise time tolerance	t _r	24			ps	1
Data input rise time tolerance	t _f	24			ps	1
Electrical input eye mask definition	{X1, X2}	{0.31, 0.5}			UI	
	{Y1, Y2}	{42.5, 425}			mV	
Receiver						
Signaling rate per lane				11.2	Gb/s	
Differential data output swing per lane	V _{out,pp}			760	mV	
Data output rise time	t _r	24			ps	1
Data output fall time	t _f	24			ps	1
Electrical output eye mask definition	{X1, X2}	{0.2, 0.5}			UI	
	{Y1, Y2}	{136, 380}			mV	
Power Supply Noise Tolerance	V _{rip}	Per Table 4-1 in the CFP MSA				

Notes:

1.20% to 80%

Optical Characteristics (EOL, TOP = 0 to 70°C, VCC = 3.2 to 3.4 Volts)

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						
Signaling Speed per Lane		25.78		25.78	Gb/s	1
Lane center wavelengths (range)		1294.53 – 1296.59			nm	
		1299.02 – 1301.09				
		1303.54 – 1305.63				
		1308.09 – 1310.19				

Total Average Launch Power	POUT			10.5	dBm	
Transmit OMA per Lane	TxOMA	-1.0		4.5	dBm	
Average Launch Power per Lane	TXP _x	-2.9		4.5	dBm	2
Optical Extinction Ratio	ER	8.2			dB	
Sidemode Suppression ratio	SSR _{mi}	30			dB	
Average launch power of OFF transmitter, per lane				-30	dBm	
Relative Intensity Noise	RIN			-130	dB/Hz	
Optical Return Loss Tolerance				20	dB	
Transmitter Reflectance				-12	dB	
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3}		{0.25, 0.4, 0.45, 0.25, 0.28,				

Parameter	Sym	Min	Typ	Max	Unit	Ref.
Receiver						
Signaling Speed per Lane		25.78		25.78	GBd	3
Lane center wavelengths (range)		1294.53 1296.59 1299.02 1301.09 1303.54 – 1305.63 1308.09 – 1310.19	nm			
Receive Power (OMA) per Lane	RxOMA			4.5	dBm	
Average Receive Power per Lane	RXP _x	-20.9		4.5	dBm	4
Receiver Sensitivity (OMA) per Lane	Rxsens			-18	dBm	5

Stressed Receiver Sensitivity (OMA) per Lane	SRS			-16	dBm	6,7
Return Loss	RL	-20			dB	
Vertical eye closure penalty, per lane				2.5	dB	
Receive electrical 3 dB upper cutoff frequency, per lane				31	GHz	
LOS De-Assert	LOSD			-19	dBm	
LOS Assert	LOSA			- 21	dBm	
LOS Hysteresis			1		dBm	

Notes:

1. Transmitter consists of 4 lasers operating at 25.78Gb/s each.
2. Minimum value is informative.
3. Receiver consists of 4 photodetectors operating at 25.78Gb/s each.
4. Minimum value is informative, equals min TxOMA with infinite ER and max channel insertion loss.
5. Receiver sensitivy(OMA),each lane(MAX)is informative.
6. Measured with conformance test signal at TP3 BER=10⁻¹²
7. Conditions of stressed receiver sensitivity test: Vertical eye closure penalty for each lane is 1.8dB, stressed eye J2 jitter for each lane is 0.3UI;stressed eye J9 jitter for each lane is 0.47UI.

Pin Descriptions

	Top Row		Bottom Row
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		Bottom Row
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

**Bottom Row Pin
Descriptions**

PIN #	Name	I/O	Logic	Description
1	3.3V_GN			3.3V Module Supply Voltage Return Ground, internally connected
2	3.3V_GN			
3	3.3V_GN			
4	3.3V_GN			
5	3.3V_GN			
6	3.3			3.3V Module Supply Voltage
7	3.3			
8	3.3			
9	3.3			
10	3.3			
11	3.3			
12	3.3			
13	3.3			
14	3.3			
15	3.3			
16	3.3V_GN			3.3V Module Supply Voltage Return Ground, internally connected
17	3.3V_GN			
18	3.3V_GN			
19	3.3V_GN			
20	3.3V_GN			
21	VND_IO_	I/O		Module Vendor I/O A. Do
22	VND_IO_	I/O		Module Vendor I/O B. Do
23	GN			
24	TX_MCLK	O		Freq = Optical rate/32. Utilized for optical waveform testing. Not for

25	TX_MCLK	O		Freq = Optical rate/32. Utilized for optical waveform testing. Not for
26	GN			
27	VND_IO_	I/O		Module Vendor I/O C. Do
28	VND_IO_	I/O		Module Vendor I/O D. Do
29	VND_IO_	I/O		Module Vendor I/O E. Do
30	PRG_CNTL 1	I	LVC MOS w/ PUR	Programmable Control 1 set over MDIO, Default: TRXIC_RSTn, TX & RX ICs reset, "0": reset; "1" or NC: enabled (i.e., not used).
31	PRG_CNTL 2	I	LVC MOS w/ PUR	Programmable Control 2 set over MDIO, Default: Hardware Interlock LSB, "00": ≤8W; "01": ≤16W; "10": ≤24W; "11" or NC: ≤32W (i.e., not used).
32	PRG_CNTL 3	I	LVC MOS w/ PUR	Programmable Control 3 set over MDIO, Default: Hardware Interlock MSB, "00": ≤8W; "01": ≤16W; "10": ≤24W; "11" or NC: ≤32W (i.e., not used).
33	PRG_ALR M1	O	LVC MOS	Programmable Alarm 1 set over MDIO, Default: HIPWR_ON, "1": module power up completed; "0": module not high powered up.
34	PRG_ALR	O	LVC MOS	Programmable Alarm 2 set over MDIO, Default: MOD_READY, "1": Ready; "0": not Ready.
35	PRG_ALR M3	O	LVC MOS	Programmable Alarm 3 set over MDIO, Default: MOD_FAULT, fault detected, "1": Fault; "0": No Fault.
36	TX_DIS	I	LVC MOS w/ PUR	Transmitter Disable for all lanes, "1" or NC = transmitter disabled, "0" = transmitter enabled
37	MOD_LOP WR	I	LVC MOS w/ PUR	Module Low Power Mode. "1" or NC: module in low power (safe) mode, "0": power-on enabled
38	MOD_AB	O	GN	Module Absent. "1" or NC: module absent, "0": module present, Pull Up Resistor on Host
39	MOD_RST n	I	LVC MOS w/ PDR	Module Reset. "0" resets the module, "1" or NC = module enabled, Pull Down Resistor in Module
40	RX_LOS	O	LVC MOS	Receiver Loss of Optical Signal, "1": low optical signal, "0": normal condition
41	GLB_ALRM n	O	LVC MOS	Global Alarm. "0": alarm condition in any MDIO Alarm register, "1": no alarm condition, Open Drain, Pull Up Resistor on Host
42	PRTADR4	I	1.2V	MDIO Physical Port address
43	PRTADR3	I	1.2V	MDIO Physical Port address
44	PRTADR2	I	1.2V	MDIO Physical Port address
45	PRTADR1	I	1.2V	MDIO Physical Port address

46	PRTADR0	I	1.2V	MDIO Physical Port address
47	MDIO	I/O	1.2V	Management Data I/O bi-directional data (electrical specs as per
48	MD	I	1.2V	Management Data Clock (electrical specs as per 802.3ae and ba)
49	GN			
50	VND_IO_	I/O		Module Vendor I/O F. Do Not
51	VND_IO_	I/O		Module Vendor I/O G. Do
52	GN			
53	VND_IO_	I/O		Module Vendor I/O H. Do
54	VND_IO_	I/O		Module Vendor I/O J. Do Not
55	3.3V_GN			3.3V Module Supply Voltage Return Ground, internally connected to
56	3.3V_GN			
57	3.3V_GN			
58	3.3V_GN			
59	3.3V_GN			

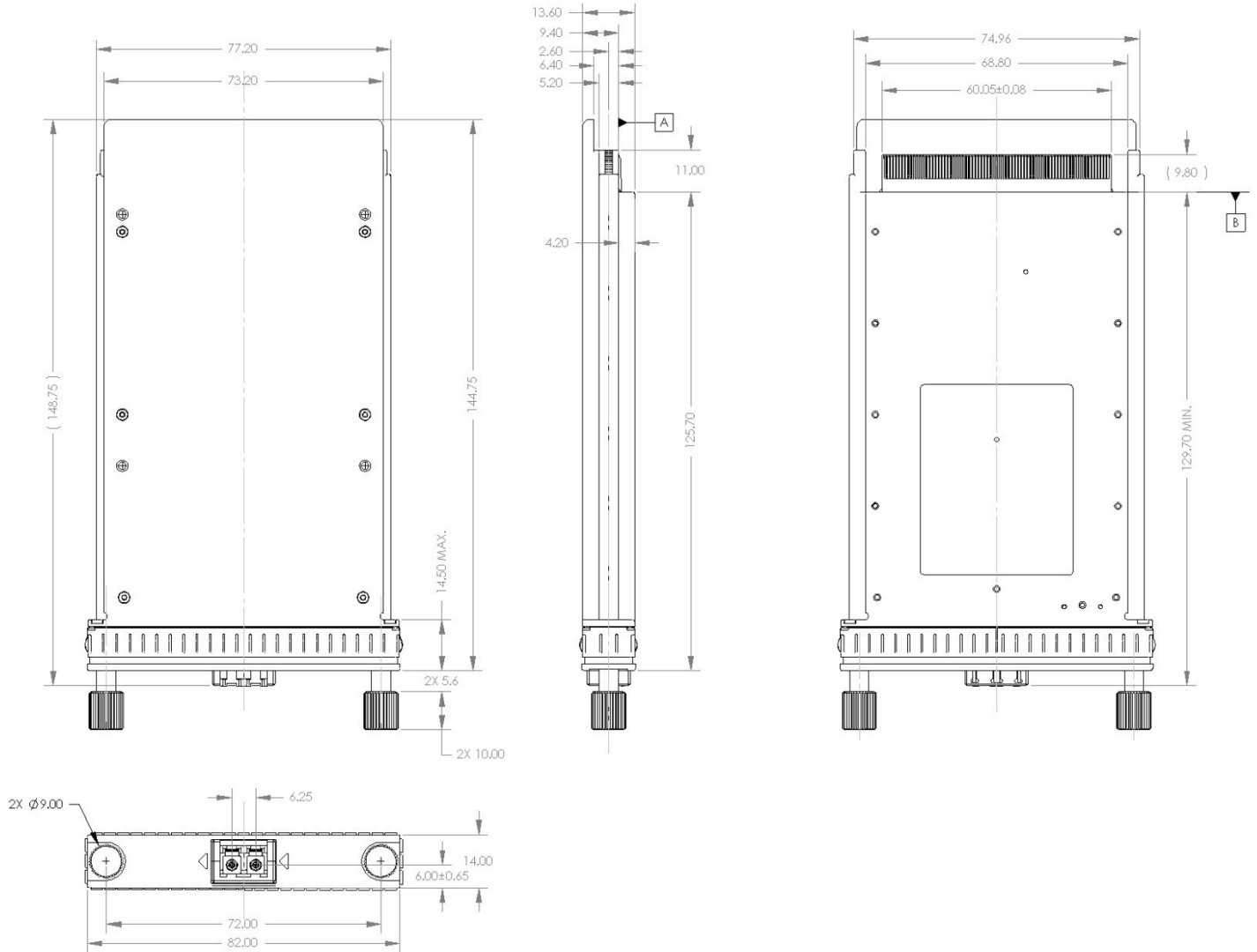
PIN #	Name	I/O	Logic	Description
60	3.3V			3.3V Module Supply Voltage
61	3.3V			
62	3.3V			
63	3.3V			
64	3.3V			
65	3.3V			
66	3.3V			
67	3.3V			
68	3.3V			
69	3.3V			



100Gb/s 4x LWDM Channel CFP2 ER4 TRx, 30km
HOLS-CFP2LW30-LD-CE

70	3.3V_GND			3.3V Module Supply Voltage Return Ground,
71	3.3V_GND			
72	3.3V_GND			
73	3.3V_GND			
74	3.3V_GND			

Mechanical Dimensions





100Gb/s 4x LWDM Channel CFP2 ER4 TRx, 30km
HOLS-CFP2LW30-LD-CE

ORDERING INFORMATION

Part Number	Description
HOLS-CFP2LW30-LD-CE	100G CFP ER4 30Km 25G per lane,0-70C