Regulatory Compliance

Applicable Standard	Product Certificate
EN 60950-1:2006+A11+A1+A12	TUV
EN 60825-1:2007	
EN 60825-2:2004+A1+A2	
UL 60950-1	UL
CSA C22.2 No. 60950-1-07	
EN 55022:2006	EMC CE
EN 55024:1998+A1+A2	
IEC 60825-2	CB
IEC 60950-1	
47 CFR PART 15 OCT., 2010	FCC
47 CFR PART 15 OCT., 2010	
CDRH 1040.10	FDA
2011/65/EU	RoHS

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	Ts	-40	+85	°C
Supply Voltage	Vcc	-0.5	3.6	V
Operating Relative Humidity(non-condensing)	RH	5	85	%

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	T_C	0	+25	+70	°C
Power Supply Voltage	Vcc	3.2	3.3	3.4	V
Power Dissipation	Pm	-	-	8	W
Low Power Mode Dissipation	Plow	-	-	2	w
Aggregate Bit Rate	BR_{Aggr}	-	103.125	-	Gbps
Lane Bit Rate	BR_{LANE}	-	10.3125	-	Gbps

Performance Specifications – Electrical

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Transmitter						
AC common mode input voltage tolerance		-	-	20	mV	RMS
Input Impedance (Differential)	Zin	90	100	110	ohms	
Input High Voltage	V_{IH}	2	-	Vcc+0.3	V	3.3V LVCMOS
		0.84	-	1.5	V	1.2V LVCMOS
Input Low Voltage	V_{IL}	-0.3	-	0.8	V	3.3V LVCMOS
		-0.3	-	0.36	V	1.2V LVCMOS
Receiver						
Differential output voltage, peak-to-peak		-	-	760	mV	
AC common mode output voltage		-	-	15	mV	RMS
Termination mismatch at 1MHz		-	-	5	%	
Output impedance (Differential)	Zout	90	100	110	ohms	
Output rise and fall time		24			ps	20%~80%
Output High Voltage	V_{OH}	Vcc-0.2	-	-	V	3.3V LVCMOS (I_{OH}=-100uA)
		1.0	-	1.5	V	1.2V LVCMOS
Output Low Voltage	V_{OL}	-	-	0.2	V	3.3V LVCMOS (I_{OL}=100uA)
		-0.3	-	0.2	V	1.2V LVCMOS

Optical and Electrical Characteristics

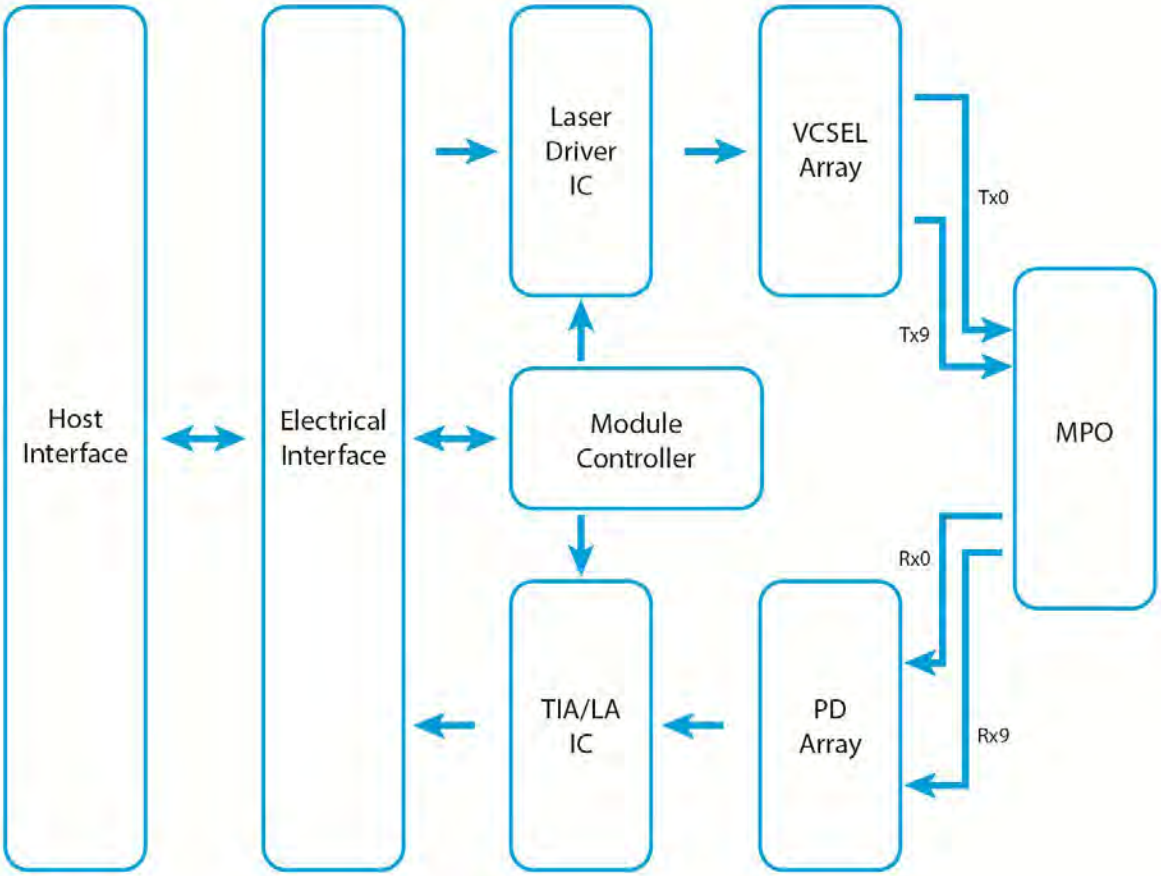
Parameter	Symbol	Min.	Typical	Max.	Unit
OM3 MMF	L	0.5	-	100	m
Aggregate Bit Rate	BR_{Aggr}	-	103.125	-	Gbps
Per Lane Bit Rate	BR_{LANE}	-	10.3125	-	Gbps
Transmitter					
Center Wavelength	λ_C	840	850	860	nm
RMS spectral width	RMS	-	-	0.65	nm
Average Launch Power, Each Lane*(note3)	Pout/lane	-7.6	-	2.4	dBm
Transmit OMA, per Lane	TX_OMA/lane	-5.6	-	3	dBm
Difference in launch power between any two lanes(OMA)		-	-	4	dB
Peak power, each lane		-	-	4	dBm
Transmitter and dispersion penalty, each lane	TDP/lane	-	-	3.5	dB
Extinction Ratio*(note4)	ER	3	-	-	dB
Optical Return Loss Tolerance		-	-	12	dB
Average launch power of OFF		-	-	-30	dBm
transmitter, each lane					
Output Optical Eye*(note4)	IEEE 802.3ba-2010 Compliant				
Receiver					
Center Wavelength	λ_C	840	850	860	nm
Damage Threshold		3.4	-	-	dBm
Optical modulation amplitude, each lane		-	-	3	dBm
Stressed receiver sensitivity in OMA, each lane		-	-	-5.4	dBm
Average power at receiver input, each lane	RX/lane	-9.5*(note5)	-	+2.4	dBm
Peak power, each lane		-	-	4	dBm
Receiver reflectance	Rr	-	-	-12	dB

Note3: Output is coupled into a 50/125μm multi-mode fiber.

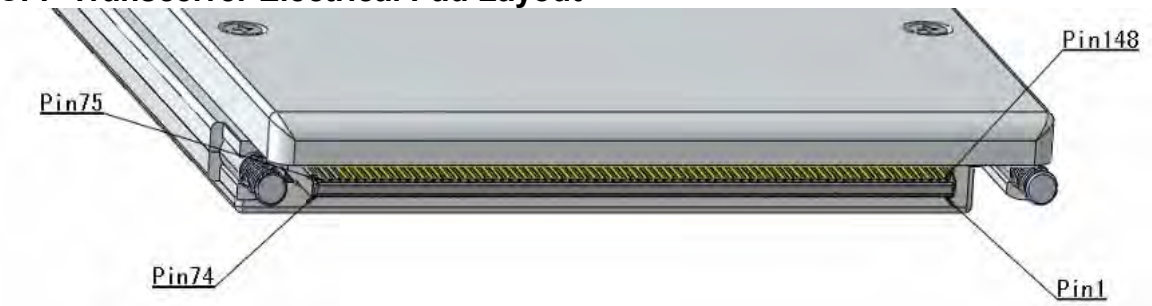
Note4: Filtered, measured with a PRBS 2^{31}-1 test pattern @10.3125Gbps

Note5: Minimum average optical power measured at BER less than 1E-12, with a 2^{31}-1 PRBS.

Functional Description of Transceiver



CFP Transceiver Electrical Pad Layout



	Top Row (2nd Half)
148	GND
147	REFCLKn
146	REFCLKp
145	GND
144	N.C.
143	N.C.
142	GND
141	TX9n
140	TX9p
139	GND
138	TX8n
137	TX8p
136	GND
135	TX7n
134	TX7p
133	GND
132	TX6n
131	TX6p
130	GND
129	TX5n
128	TX5p
127	GND
126	TX4n
125	TX4p
124	GND
123	TX3n
122	TX3p
121	GND
120	TX2n
119	TX2p
118	GND
117	TX1n
116	TX1p
115	GND
114	TX0n
113	TX0p

	Bottom Row (2st Half)
1	3.3V_GND
2	3.3V_GND
3	3.3V_GND
4	3.3V_GND
5	3.3V_GND
6	3.3V
7	3.3V
8	3.3V
9	3.3V
10	3.3V
11	3.3V
12	3.3V
13	3.3V
14	3.3V
15	3.3V
16	3.3V_GND
17	3.3V_GND
18	3.3V_GND
19	3.3V_GND
20	3.3V_GND
21	VND_IO_A
22	VND_IO_B
23	GND
24	(TX_MCLKn)
25	(TX_MCLKp)
26	GND
27	VND_IO_C
28	VND_IO_D
29	VND_IO_E
30	PRG_CNTL1
31	PRG_CNTL2
32	PRG_CNTL3
33	PRG_ALRM1
34	PRG_ALRM2
35	PRG_ALRM3
36	TX_DIS

112	**GND**

	Top Row (1st Half)
111	**GND**
110	**N.C.**
109	**N.C.**
108	**GND**
107	**RX9n**
106	**RX9p**
105	**GND**
104	**RX8n**
103	**RX8p**
102	**GND**
101	**RX7n**
100	**RX7p**
99	**GND**
98	**RX6n**
97	**RX6p**
96	**GND**
95	**RX5n**
94	**RX5p**
93	**GND**
92	**RX4n**
91	**RX4p**
90	**GND**
89	**RX3n**
88	**RX3p**
87	**GND**
86	**RX2n**
85	**RX2p**
84	**GND**
83	**RX1n**
82	**RX1p**
81	**GND**
80	**RX0n**
79	**RX0p**
78	**GND**
77	**(RX_MCLKn)**
76	**(RX_MCLKp)**
75	**GND**

37	**MOD_LOPWR**

	Bottom Row (1st Half)
38	**MOD_ABS**
39	**MOD_RSTn**
40	**RX_LOS**
41	**GLB_ALRMn**
42	**PRTADR4**
43	**PRTADR3**
44	**PRTADR2**
45	**PRTADR1**
46	**PRTADR0**
47	**MDIO**
48	**MDC**
49	**GND**
50	**VND_IO_F**
51	**VND_IO_G**
52	**GND**
53	**VND_IO_H**
54	**VND_IO_J**
55	**3.3V_GND**
56	**3.3V_GND**
57	**3.3V_GND**
58	**3.3V_GND**
59	**3.3V_GND**
60	**3.3V**
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**
70	**3.3V_GND**
71	**3.3V_GND**
72	**3.3V_GND**
73	**3.3V_GND**
74	**3.3V_GND**

Pin Arrangement and Definition

Pin	Logic	Symbol	Description
1		3.3V_GND	3.3V Module Supply Voltage Return Ground, can be separate or tied together with Signal Ground
2		3.3V_GND	
3		3.3V_GND	
4		3.3V_GND	
5		3.3V_GND	
6		3.3V	3.3V Module Supply Voltage
7		3.3V	
8		3.3V	
9		3.3V	
10		3.3V	
11		3.3V	
12		3.3V	
13		3.3V	
14		3.3V	
15		3.3V	
16		3.3V_GND	
17		3.3V_GND	
18		3.3V_GND	
19		3.3V_GND	
20		3.3V_GND	
21		VND_IO_A	Module Vendor I/O A. Do Not Connect!
22		VND_IO_B	Module Vendor I/O B. Do Not Connect!
23		GND	
24	CML	(TX_MCLKn)	For optical waveform testing. Not for normal use.
25	CML	(TX_MCLKp)	For optical waveform testing. Not for normal use.
26		GND	
27		VND_IO_C	Module Vendor I/O C. Do Not Connect!
28		VND_IO_D	Module Vendor I/O D. Do Not Connect!
29		VND_IO_E	Module Vendor I/O E. Do Not Connect!
30	LVCMOSw/PUR	PRG_CNTL1	Programmable Control 1 set over MDIO, MSA Default: TRXIC_RSTn, TX & RX ICs reset, “0”: reset, “1” or NC: enabled = not used
31	LVCMOSw/PUR	PRG_CNTL2	Programmable Control 2 set over MDIO, MSA Default: Hardware Interlock LSB, “00”: ≤8W, “01”: ≤16W, “10”: ≤ 24W, “11” or NC: ≤32W = not used

32	LVCMOSw/PUR	PRG_CNTL3	Programmable Control 3 set over MDIO, MSA Default: Hardware Interlock MSB, “00”: ≤8W, “01”: ≤16W, “10”: ≤ 24W, “11” or NC: ≤32W = not used
33	LVCMOS	PRG_ALRM1	Programmable Alarm 1 set over MDIO, MSA Default: HIPWR_ON, “1”: module power up completed, “0”: module not high power up
34	LVCMOS	PRG_ALRM2	Programmable Alarm 2 set over MDIO, MSA Default: MOD_READY, “1”: Ready, “0”: not Ready
35	LVCMOS	PRG_ALRM3	Programmable Alarm 3 set over MDIO, MSA Default: MOD_FAULT, fault detected, “1”: Fault, “0”: No Fault
36	LVCMOSw/PUR	TX_DIS	Transmitter Disable for all lanes, “1” or NC = transmitter disabled, “0” = transmitter enabled
37	LVCMOSw/PUR	MOD_LOPWR	Module Low Power Mode. “1” or NC: module in low power (safe) mode, “0”: power-on enabled
38	GND	MOD_ABS	Module Absent. “1” or NC: module absent, “0”: module present, Pull Up Resistor on Host
39	LVCMOSw/PDR	MOD_RSTn	Module Reset. “0” resets the module, “1” or NC = module enabled, Pull Down Resistor in Module
40	LVCMOS	RX_LOS	Receiver Loss of Optical Signal, “1”: low optical signal, “0”: normal condition
41	LVCMOS	GLB_ALRMn	Global Alarm. “0”: alarm condition in any MDIO Alarm register, “1”: no alarm condition, Open Drain, Pull Up Resistor on Host
42	1.2V CMOS	PRTADR4	MDIO Physical Port address bit 4
43	1.2V CMOS	PRTADR3	MDIO Physical Port address bit 3
44	1.2V CMOS	PRTADR2	MDIO Physical Port address bit 2
45	1.2V CMOS	PRTADR1	MDIO Physical Port address bit 1
46	1.2V CMOS	PRTADR0	MDIO Physical Port address bit 0
47	1.2V CMOS	MDIO	Management Data I/O bi-directional data (electrical specs as per 802.3ae and ba)
48	1.2V CMOS	MDC	Management Data Clock (electrical specs as per 802.3ae and ba)
49		GND	
50		VND_IO_F	Module Vendor I/O F. Do Not Connect!
51		VND_IO_G	Module Vendor I/O G. Do Not Connect!
52		GND	
53		VND_IO_H	Module Vendor I/O H. Do Not Connect!
54		VND_IO_J	Module Vendor I/O J. Do Not Connect!
55		3.3V_GND	3.3V Module Supply Voltage Return Ground, can be separate or tied together with Signal Ground
56		3.3V_GND	

57	3.3V_GND	
58	3.3V_GND	
59	3.3V_GND	
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	
70	3.3V_GND	3.3V Module Supply Voltage Return Ground, can be separate or tied together with Signal Ground
71	3.3V_GND	
72	3.3V_GND	
73	3.3V_GND	
74	3.3V_GND	

Mechanical Specifications