

OSFP-800G-2FR4

800G OSFP 2xFR4 Transceiver

Hot Pluggable, +3.3V, Dual LC, 1271/1291/1311/1331nm, SMF, 2km, Commercial Temperature

FEATURES

- Compliant with IEEE 802.3cu-2021: 2x400GBASE-FR4 optical interface
- Compliant with IEEE P802.3ck D3.0: 2x400GAUI-4 C2M electrical interface
- Compliant with OSFP MSA HW Rev 4.1
- Type 2 housing with dual LC connector
- Compliant with CMIS Rev 5.0
- Two wire serial Interface with digital diagnostic monitoring
- Complies with EU Directive 2011/65/EU (RoHS compliant)
- Class 1 Laser
- Commercial Operating Temperature Range: 0 to 70°C

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T _s	-40	85	°C
Supply Voltage	V _{CC}	-0.5	3.6	V
Relative Humidity (non-condensing)	RH	5	95	%
Data Input Voltage Differential	I _V DIP-V _{DIN} I	-	1	V
Control Input Voltage	V _I	-0.3	V _{CC} +0.5	V
Control Output Current	I _O	-20	20	mA

RECOMMENDED OPERATING ENVIRONMENT

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Operating Case Temperature	T _{OPR}	0	-	70	°C	
Power Supply Voltage	V _{CC}	3.135	3.3	3.465	V	
Instantaneous peak current at hot plug	I _{CC_IP}	-	-	TBD	mA	
Sustained peak current at hot plug	I _{CC_SP}	-	-	TBD	mA	
Maximum Power Dissipation	P _D	-	-	TBD	W	
Maximum Power Dissipation, Low Power Mode	P _{DLP}	-	-	2	W	
Signalling Speed per Lane	DRL	-	53.125	-	GBd	
Control Input Voltage High	V _{IH}	V _{CC} *0.7	-	V _{CC} +0.3	V	
Control Input Voltage Low	V _{IL}	-0.3	-	V _{CC} *0.3	V	
Two Wire Serial Interface Clock Rate	-	-	-	400	kHz	
Power Supply Noise 1 kHz - 1 MHz (p-p)	-	-	-	66	mVpp	
Operating Distance	-	2	-	2000	m	

OPTICAL PARAMETERS

Parameter	Symbol	Min	Typical	Max	Unit	Notes
TRANSMITTER						
Wavelength L0, L4	$\lambda_{C0}, \lambda_{C4}$	1264.5	1271	1277.5	nm	
Wavelength L1, L5	$\lambda_{C1}, \lambda_{C5}$	1284.5	1291	1297.5	nm	
Wavelength L2, L6	$\lambda_{C2}, \lambda_{C6}$	1304.5	1311	1317.5	nm	
Wavelength L3, L7	$\lambda_{C3}, \lambda_{C7}$	1324.5	1331	1337.5	nm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Total average launch power	AOP _T	-	-	10.4	dBm	
Average Launch Power, each lane	AOP _L	-3.2	-	4.4	dBm	1
Outer Optical Modulation Amplitude (OMA _{outer}), each Lane for TDECQ <1.4 dB for 1.4 dB ≤ TDECQ ≤ 3.4 dB	T _{OMA}	-0.2 -1.6+TDECQ	-	3.7	dBm	
Difference in launch power between any two lanes (OMA _{outer})	AOP _d	-	-	3.9	dB	
Transmitter and Dispersion Eye Closure for PAM4 (TDECQ), each lane	TDECQ	-	-	3.4	dB	
Transmitter eye closure for PAM4 (TECQ), each lane	TECQ	-	-	3.4	dB	
TDECQ – TECQ	-	-	-	2.5	dB	
Over/under-shoot	-	-	-	22	%	
Transmitter power excursion	-	-	-	1.8	dBm	
Average Launch Power of OFF Transmitter, each lane	T _{OFF}	-	-	-16	dBm	
Extinction Ratio	ER	3.5	-	-	dB	
Transmitter transition time (max)	Tr	-	-	17	ps	
RIN17.1OMA (max)	RIN	-	-	-136	dB/Hz	
Optical Return Loss Tolerance	ORL	-	-	17.1	dB	
Transmitter Reflectance	T _R	-	-	-26	dB	2
RECEIVER						
Wavelength L0, L4	$\lambda_{C0}, \lambda_{C4}$	1264.5	1271	1277.5	nm	
Wavelength L1, L5	$\lambda_{C1}, \lambda_{C5}$	1284.5	1291	1297.5	nm	
Wavelength L2, L6	$\lambda_{C2}, \lambda_{C6}$	1304.5	1311	1317.5	nm	
Wavelength L3, L7	$\lambda_{C3}, \lambda_{C7}$	1324.5	1331	1337.5	nm	
Damage Threshold, each Lane	AOP _D	5.4	-	-	dBm	
Average Receive Power, each Lane	AOP _R	-7.2	-	4.4	dBm	
Receive Power (OMA _{outer}), each Lane	OMA _R	-	-	3.7	dBm	
Difference in receive power between any two lanes (OMA _{outer}) (max)	AOP _g	-	-	4.1	dB	
Receiver Reflectance	RR	-	-	-26	dB	

CONTINUED

Receiver sensitivity (OMAouter), each lane for $\text{TECQ} < 1.4 \text{ dB}$ for $1.4 \text{ dB} \leq \text{TECQ} \leq 3.4 \text{ dB}$	SOMA	-	-	-4.6 -6+TECQ	dBm	
Stressed Receiver Sensitivity (OMAouter), each Lane	SRS	-	-	-2.6	dBm	1
CONDITIONS OF STRESSED RECEIVER SENSITIVITY TEST						
Stressed eye closure for PAM4 (SECQ), lane under test	-	-	3.4	-	dB	
OMAouter of each aggressor lane	-	-	1.4	-	dBm	

Note:

1. RMS spectral width is the standard deviation of the spectrum
2. Measured with conformance test signal at TP3 for the BER = 2.4×10^{-4}

ELECTRICAL CHARACTERISTICS (High Speed Signal - compliant with IEEE802.3ck C2M)

Parameter	Symbol	Min	Typical	Max	Unit	Note
TRANSMITTER (Module Input, TP1)						
Differential pk-pk input Voltage tolerance (TP1a)	-	750	-	-	mV	
AC common-mode RMS voltage tolerance (TP1a)	-	25	-	-	mV	
Differential-mode to common-mode return loss	RLcd	802.3ck 120G-2			dB	
Effective return loss	ERL	8.5	-	-	dB	
Differential termination mismatch	-	-	-	10	%	
Single-ended voltage tolerance range	-	-0.4	-	3.3	V	
DC common-mode voltage tolerance	-	-0.35	-	2.85	V	
RECEIVER (Module Output, TP4)						
AC common-mode output Voltage (RMS)	-	-	-	25	mV	
Differential peak-to-peak output voltage: Short mode Long mode	-	-	-	600 845	mV	
Eye height	EH	15	-	-	mV	
Vertical eye closure	VEC	-	-	12	dB	
Common-mode to differential-mode return loss	RLDc	802.3ck 120G-1			dB	
Effective return loss	ERL	8.5	-	-	dB	
Differential termination mismatch	-	-	-	10	%	
Transition time	-	8.5	-	-	ps	
DC common-mode voltage tolerance	-	-0.35	-	2.85	V	

ELECTRICAL CHARACTERISTICS (Low Speed Control and Sense Signals - compliant with OSFP MSA HW Rev 4.1)

Parameter	Symbol	Min.	Max.	Unit
Module output SCL and SDA	V _{OL}	0	0.4	V
Module Input SCL and SDA	V _{IL}	-0.3	V _{CC} *0.3	V
	V _{IH}	V _{CC} *0.7	V _{CC} +0.5	V
InitMode, ResetL and ModSelL	V _{IL}	-0.3	0.8	V
	V _{IH}	2	V _{CC} +0.3	V
IntL	V _{OL}	0	0.4	V
	V _{OH}	V _{CC} -0.5	V _{CC} +0.3	V

PIN ASSIGNMENT

Top Side (viewed from top)

60	GND	
59	TX1p	
58	TX1n	
57	GND	
56	TX3p	
55	TX3n	
54	GND	
53	TX5p	
52	TX5n	
51	GND	
50	TX7p	
49	TX7n	
48	GND	
47	SDA	
46	VCC	
45	VCC	
44	INT/RSTn	
43	GND	
42	RX8n	
41	RX8p	
40	GND	
39	RX6n	
38	RX6p	
37	GND	
36	RX4n	
35	RX4p	
34	GND	
33	RX2n	
32	RX2p	
31	GND	

----- Module Card Edge -----

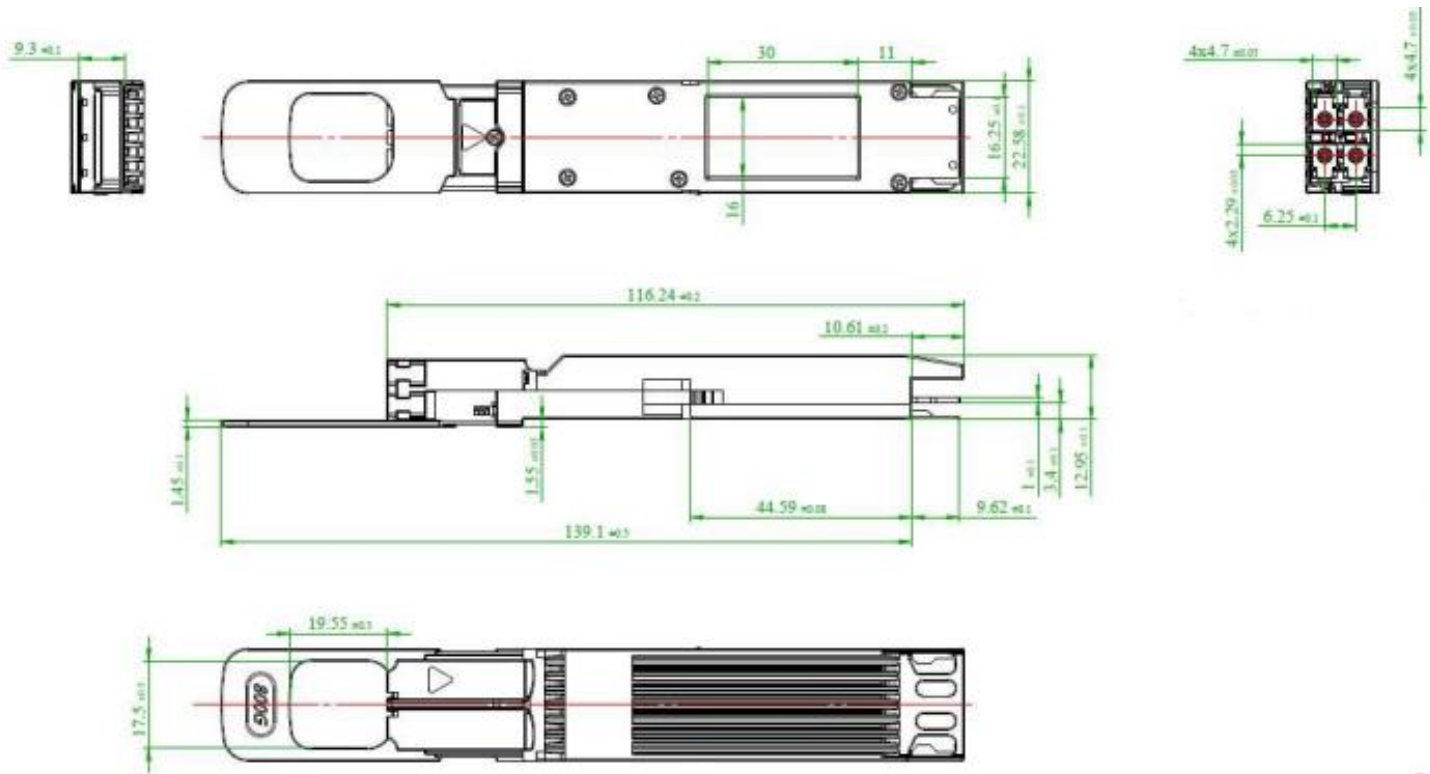
Bottom Side (viewed from bottom)

	GND	1
	TX2p	2
	TX2n	3
	GND	4
	TX4p	5
	TX4n	6
	GND	7
	TX6p	8
	TX6n	9
	GND	10
	TX8p	11
	TX8n	12
	GND	13
	SCL	14
	VCC	15
	VCC	16
	LPWn/PRSn	17
	GND	18
	RX7n	19
	RX7p	20
	GND	21
	RX5n	22
	RX5p	23
	GND	24
	RX3n	25
	RX3p	26
	GND	27
	RX1n	28
	RX1p	29
	GND	30

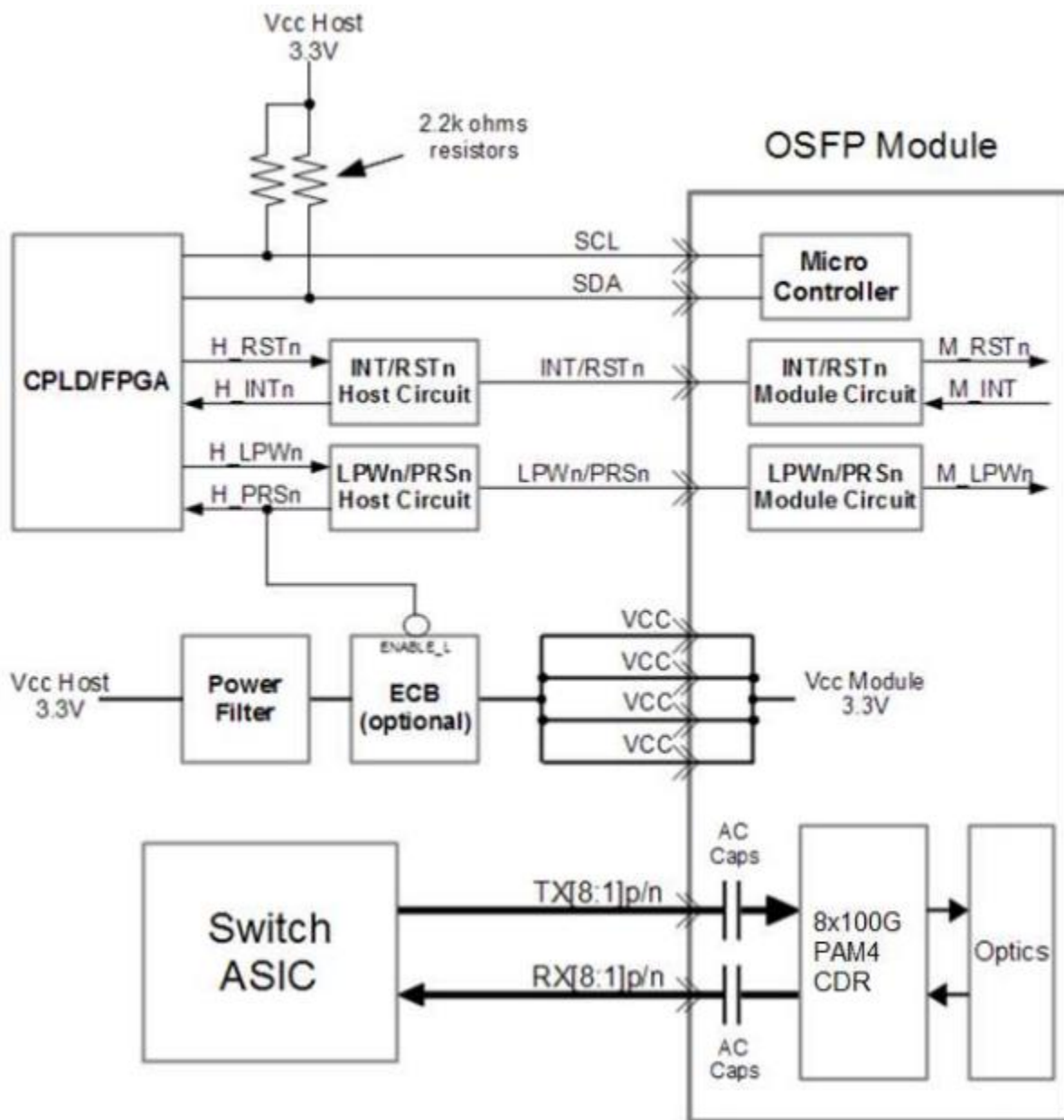
Pinout definitions of OSFP module inputs/outputs

Pin	Logic	Symbol	Description	Pin	Logic	Symbol	Description
1		GND	Ground	31		GND	Ground
2	CML-I	TX2p	Transmitter Data Non-Inverted	32	CML-O	RX2p	Receiver Data Non-Inverted
3	CML-I	TX2n	Transmitter Data Inverted	33	CML-O	RX2n	Receiver Data Inverted
4		GND	Ground	34		GND	Ground
5	CML-I	TX4p	Transmitter Data Non-Inverted	35	CML-O	RX4p	Receiver Data Non-Inverted
6	CML-I	TX4n	Transmitter Data Inverted	36	CML-O	RX4n	Receiver Data Inverted
7		GND	Ground	37		GND	Ground
8	CML-I	TX6p	Transmitter Data Non-Inverted	38	CML-O	RX6p	Receiver Data Non-Inverted
9	CML-I	TX6n	Transmitter Data Inverted	39	CML-O	RX6n	Receiver Data Inverted
10		GND	Ground	40		GND	Ground
11	CML-I	TX8p	Transmitter Data Non-Inverted	41	CML-O	RX8p	Receiver Data Non-Inverted
12	CML-I	TX8n	Transmitter Data Inverted	42	CML-O	RX8n	Receiver Data Inverted
13		GND	Ground	43		GND	Ground
14	LVC MOS-I/O	SCL	2-wire Serial interface clock	44	Multi-Level	INT/RSTn	Module Interrupt / Module Reset
15		VCC	+3.3V Power	45		VCC	+3.3V Power
16		VCC	+3.3V Power	46		VCC	+3.3V Power
17	Multi-Level	LPWn/P RSn	Low-Power Mode / Module Present	47	LVC MOS-I/O	SDA	2-wire Serial interface data
18		GND	Ground	48		GND	Ground
19	CML-O	RX7n	Receiver Data Inverted	49	CML-I	TX7n	Transmitter Data Inverted
20	CML-O	RX7p	Receiver Data Non-Inverted	50	CML-I	TX7p	Transmitter Data Non-Inverted
21		GND	Ground	51		GND	Ground
22	CML-O	RX5n	Receiver Data Inverted	52	CML-I	TX5n	Transmitter Data Inverted
23	CML-O	RX5p	Receiver Data Non-Inverted	53	CML-I	TX5p	Transmitter Data Non-Inverted
24		GND	Ground	54		GND	Ground
25	CML-O	RX3n	Receiver Data Inverted	55	CML-I	TX3n	Transmitter Data Inverted
26	CML-O	RX3p	Receiver Data Non-Inverted	56	CML-I	TX3p	Transmitter Data Non-Inverted
27		GND	Ground	57		GND	Ground
28	CML-O	RX1n	Receiver Data Inverted	58	CML-I	TX1n	Transmitter Data Inverted
29	CML-O	RX1p	Receiver Data Non-Inverted	59	CML-I	TX1p	Transmitter Data Non-Inverted
30		GND	Ground	60		GND	Ground

MECHANICAL DIMENSIONS (UNIT: mm)



RECOMMENDED HOST BOARD



Recommended OSFP Host Board Schematic

DIGITAL DIAGNOSTICS

Parameter	Range	Accuracy	Unit	Calibration
Temperature	0 to 70	±3	°C	Internal
Voltage	0 to V _{CC}	0.1	V	Internal
Tx Bias Current (Each Lane)	0 to 100	10%	mA	Internal
Tx Output Power (Each Lane)	-3.2 to +4.4	±3	dB	Internal
Rx Receive Power (Each Lane)	-7.2 to +4.4	±3	dB	Internal