800Gb/s OSFP DR8 Transceiver

S-OS800G85M1605-CD

Product Features

- ► Compliant with IEEE 802.3cu-2021: -8x100GBASE-DR optical interface
- ► Compliant with IEEE 802.3ck-2022: -8x100GAUI-1 C2M electrical interface
- ► Compliant with OSFP Module Specification Rev 5.0 type 2 housing with MPO-16
- ► connector
- ► Compliant with CMIS Rev 5.0
- ► Case operating temperature 0°C to 70°C
- ► Two wire serial Interface with digital diagnostic monitoring
- ► Complies with EU Directive 2011/65/EU (RoHS compliant)
- ► Class 1 Laser

Product Applications

- ► Data Center 800GE 500m SMF links

Performance Specifications

Absolute Maximum Ratings					
Parameter	**Symbol**	**Min.**	**Max.**	**Unit**	**Note**
Storage Temperature	Ts	-40	85	ºC	
Relative Humidity	RH	5	95	%	
Power Supply Voltage	V_{CC}	-0.5	3.6	V	
Signal Input Voltage		Vcc-0.3	Vcc+0.3	V	
Data Input Voltage Differential	$\lvert V_{DIP}-V_{DIN}\rvert$	-	1	V	
Control Input Voltage	V_I	-0.3	VCC+0.5	V	
Control Output Current	I_O	-20	20	mA	

Recommended Operating Conditions						
Parameter	**Symbol**	**Min.**	**Typ.**	**Max.**	**Unit**	**Note**
Operating Case Temperature	T_{OPR}	0	-	70	ºC	
Power Supply Voltage	V_{CC}	3.135	3.3	3.465	V	
Instantaneous peak current at hot plug	I_{CC_IP}	-	-	6600	mA	
Sustained peak current at hot plug	I_{CC_SP}	-	-	5494.5	mA	
Maximum Power Dissipation	P_D	-	-	16.5	W	
Maximum Power Dissipation, Low Power Mode	PDLP	-	-	2	W	
Signalling Speed per Lane	DRL	-	53.125	-	GBd	

Control Input Voltage High	VIH	V_{CC}*0.7	-	V_{CC}+0.3	V	
Control Input Voltage Low	VIL	-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	

Optical Characteristics

Transmitter

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Wavelength	λC	1304.5	1311	1317.5	nm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Average Launch Power, each lane	AOP_L	-2.9	-	4.0	dBm	1
Outer Optical Modulation Amplitude (OMAouter), each Lane	T_{OMA}	-0.8	-	4.2	dBm	
Launch power in OMAouter minus TDECQ, each lane for extinction ratio >= 5 dB for extinction ratio < 5 dB	$T_{OMA-TDECQ}$	-2.2 -1.9	-	-	dBm	
Transmitter and Dispersion Eye Closure for PAM4 (TDECQ), each lane	TDECQ	-	-	3.4	dB	
TDECQ – 10log10(Ceq) each lane	Ceq	-	-	3.4	dB	
Average Launch Power of OFF Transmitter, each lane	T_{OFF}	-	-	-15	dBm	
Extinction Ratio	ER	3.5	-	-	dB	
Transmitter transition time	Tr			17	ps	
RIN15.5OMA	RIN	-	-	-136	dB/Hz	
Optical return loss tolerance	ORL	-	-	15.5	dB	
Transmitter Reflectance	T_R	-	-	-26	dB	2

Optical Characteristics

Receiver

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Wavelength	λC0	1304.5	1311	1317.5	nm	
Damage Threshold, each Lane	AOP_D	5	-	-	dBm	
Average Receive Power, each Lane	AOP_R	-5.9	-	4	dBm	
Receive Power (OMAouter), each Lane	OMA_R	-	-	4.2	dBm	
Receiver Reflectance	RR	-	-	-26	dB	
Receiver Sensitivity (OMAouter), each Lane	S_{OMA}	-	-	Max(-3.9，SECQ - 5.3)	dBm	3
Stressed Receiver Sensitivity (OMAouter), each Lane	SRS	-	-	-1.9	dBm	4

Conditions of stressed receiver sensitivity test						
Stressed eye closure for PAM4 (SECQ), lane under test	SECQ	-	3.4	-	dB	
SECQ – 10log10(Ceq), lane under test	Ceq	-	-	3.4	dB	

Note：

1. Average launch power, each lane (min) is informative and not the principal indicator of signal strength.
2. Transmitter reflectance is defined looking into the transmitter.
3. Receiver sensitivity (OMAouter), each lane (max) is informative and is defined for a transmitter with a value of SECQ up to 3.4 dB.
4. Measured with conformance test signal at TP3 for the BER = 2.4x10-4.

Functional Characteristics (Electrical)

Receiver (Module Output, TP4)

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Peak-to-peak AC common-mode Voltage Low-frequency, VCMLF Full-band, VCMFB	-	-	-	 32 80	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	

Transmitter (Module Input, TP1)

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Differential pk-pk input Voltage tolerance (TP1a)	-	750	-	-	mV	
Peak-to-peak AC common-mode voltage tolerance Low-frequency, VCMLF Full-band, VCMFB	-	-	-	 32 80	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	

Electrical Specification Low Speed Control and Sense Signals					
Parameter	**Symbol**	**Min.**	**Max.**	**Unit**	**Notes**
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	
INT/RSTn	Comply with OSFP MSA 5.0 Table 13-4				

Digital Diagnostics				
Parameter	**Range**	**Accuracy**	**Unit**	**Calibration**
Temperature	0 to 70	±3	℃	Internal
Voltage	3.135 to 3.465	±3%	V	Internal
Tx Bias Current (Each Lane)	0 to 100	10%	mA	Internal
Tx Output Power (Each Lane)	-2.9 to +4	±3	dB	Internal
Rx Receive Power (Each Lane)	-5.9 to +4	±3	dB	Internal

Pin Definitions and Functions

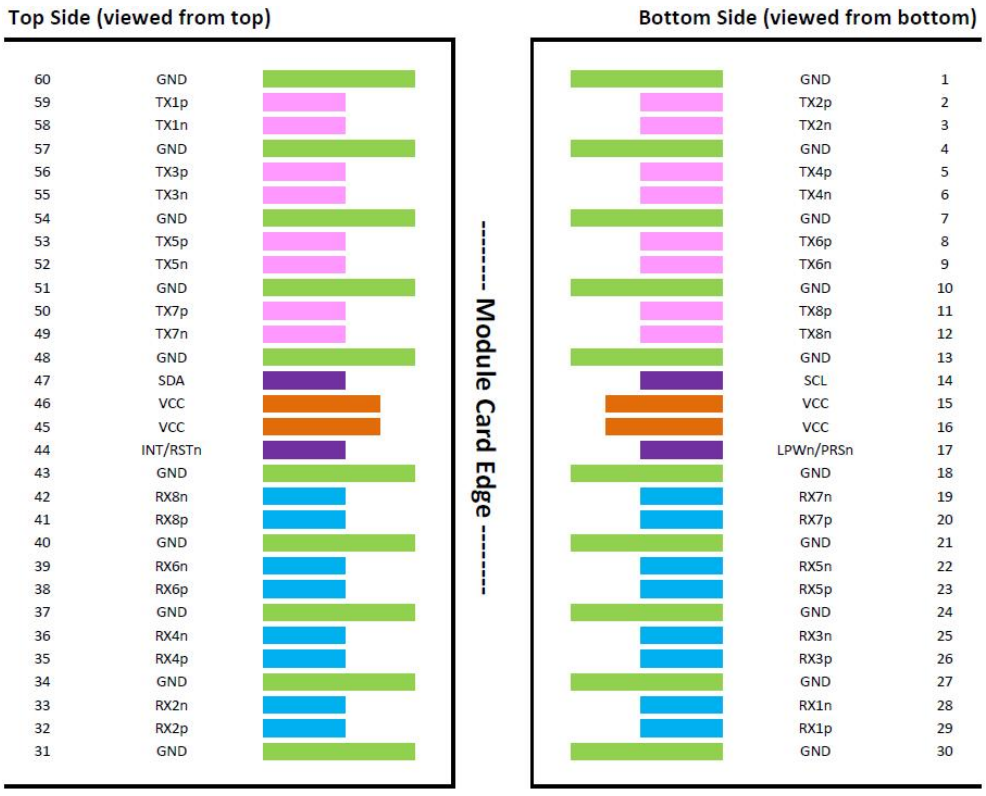
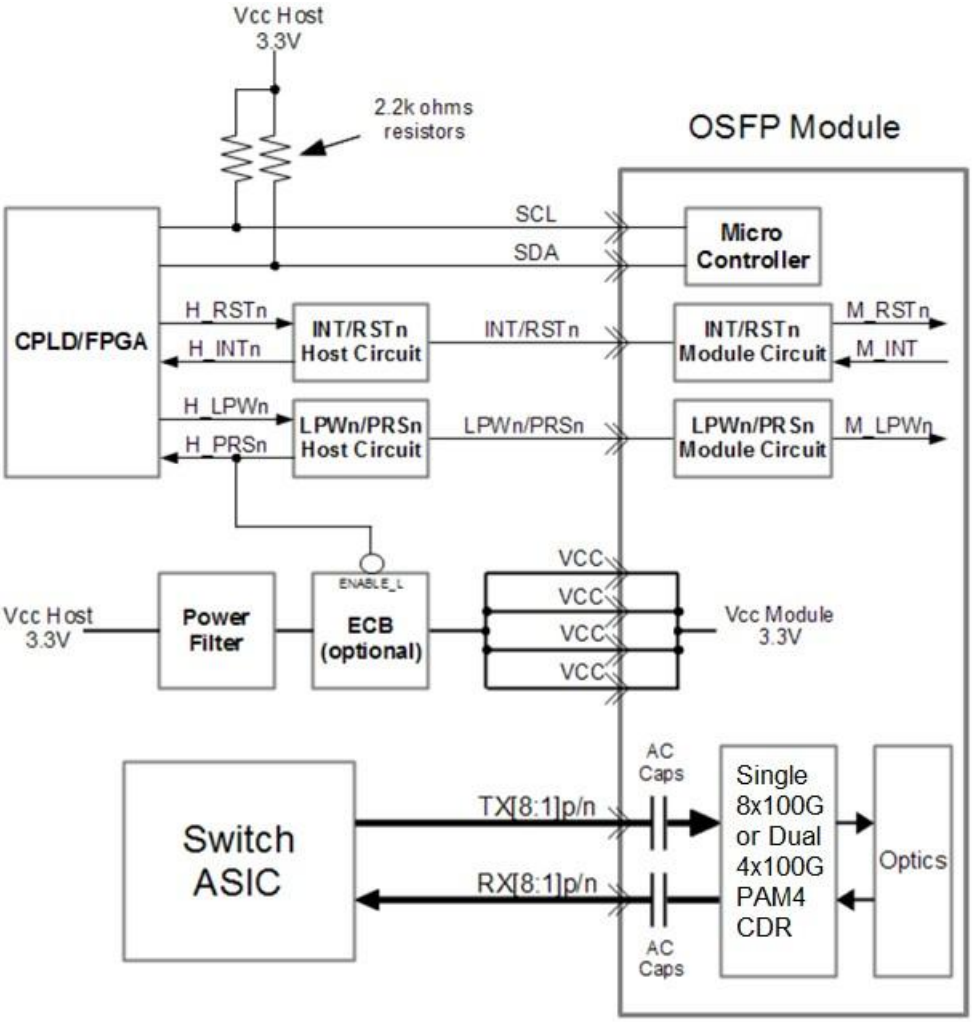


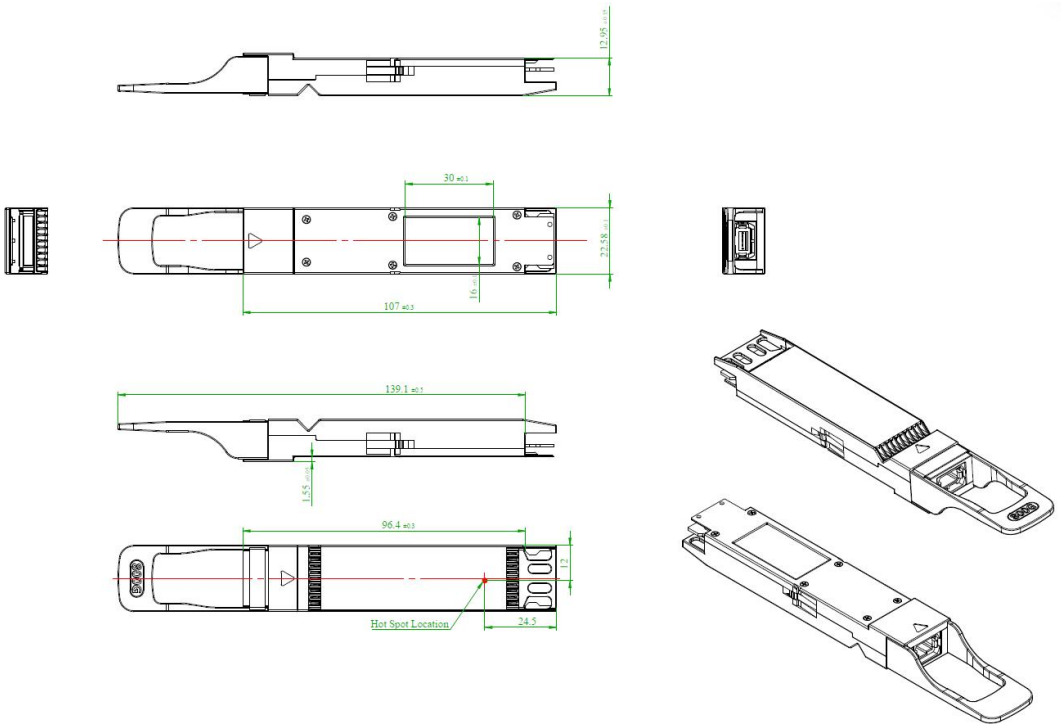
Figure 1 – Pinout definitions of OSFP module inputs/outputs

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

Recommended OSFP Host Board Schematic



Mechanical Diagram



Unit:mm

Order Information

Part Number	Description
S-OS800G85M1605-CD	800G OSFP DR8 Transceiver/0~70℃/MPO-16