ATGBICS® by APPROVED TECHNOLOGY

Technical Datasheet

OSFP-800G-DR8

800G OSFP DR8 Transceiver

Hot Pluggable, +3.3V, MPO, 1310nm, SMF, 500m, Commercial Temperature

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 MSA HW Rev 5.0 Type 2
- 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	ºC
Supply Voltage	V_{CC}	-0.5	3.6	V
Relative Humidity (non-condensing)	RH	5	95	%
Data Input Voltage Differential	$\lvert V_{DIP}-V_{DIN}\rvert$	-	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	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	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	-	500	m	

OPTICAL PARAMETERS

Parameter	Symbol	Min	Typical	Max	Unit	Notes
TRANSMITTER						
Wavelength	λ_C	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
RECEIVER						
Wavelength	λ_{C0}	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 = $2.4x10^{-4}$

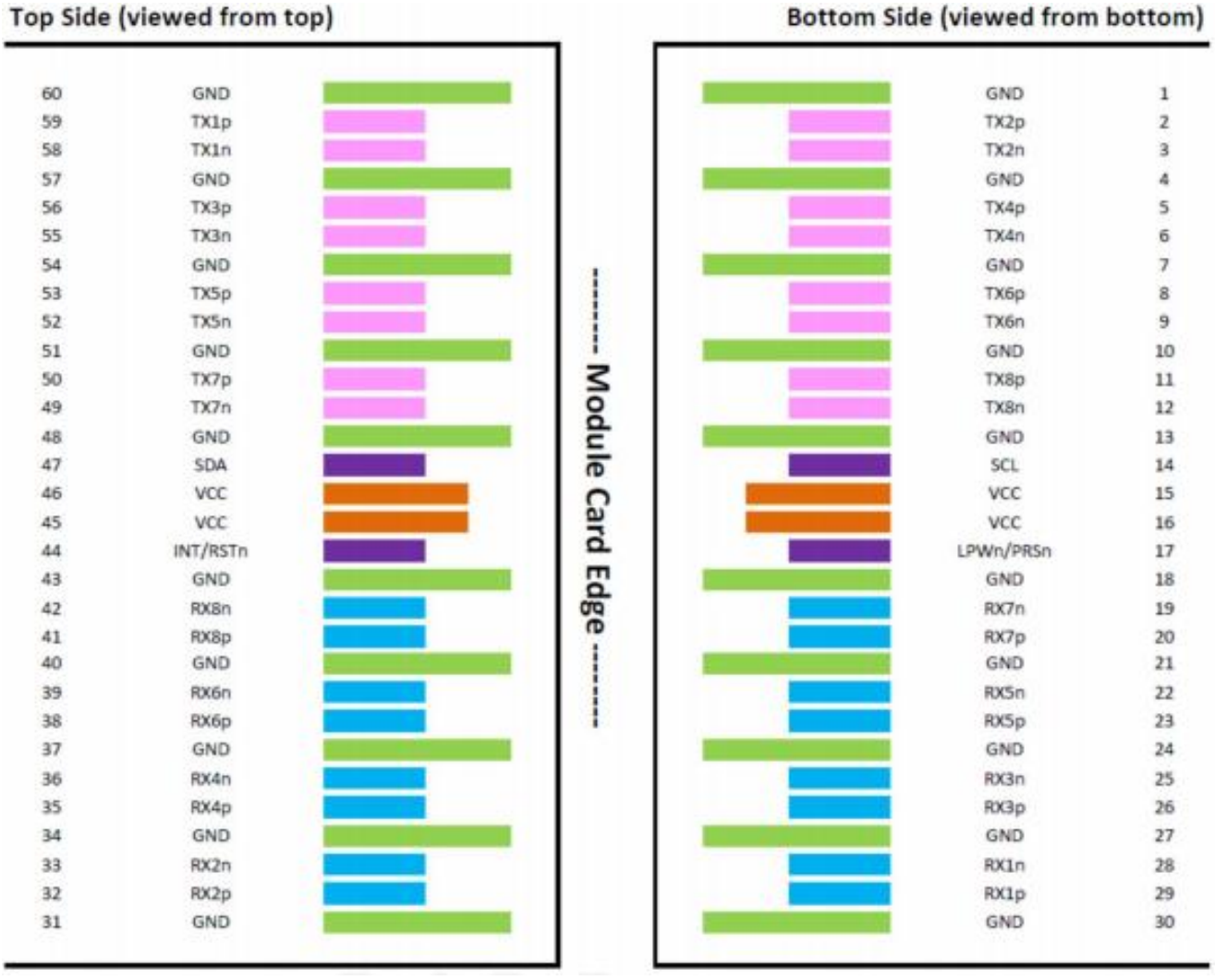
ELECTRICAL CHARACTERISTICS (High Speed Signal - compliant with IEEE802.3ck C2M)

Parameter	Symbol	Min	Typical	Max	Unit	Note
TRANSMITTER (Module Input, TP1)						
Differential pk-pk input Voltage tolerance (TP1a)	-	750	-	-	mV	
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	
RECEIVER (Module Output, TP4)						
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	

ELECTRICAL CHARACTERISTICS (Low Speed Control and Sense Signals)

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

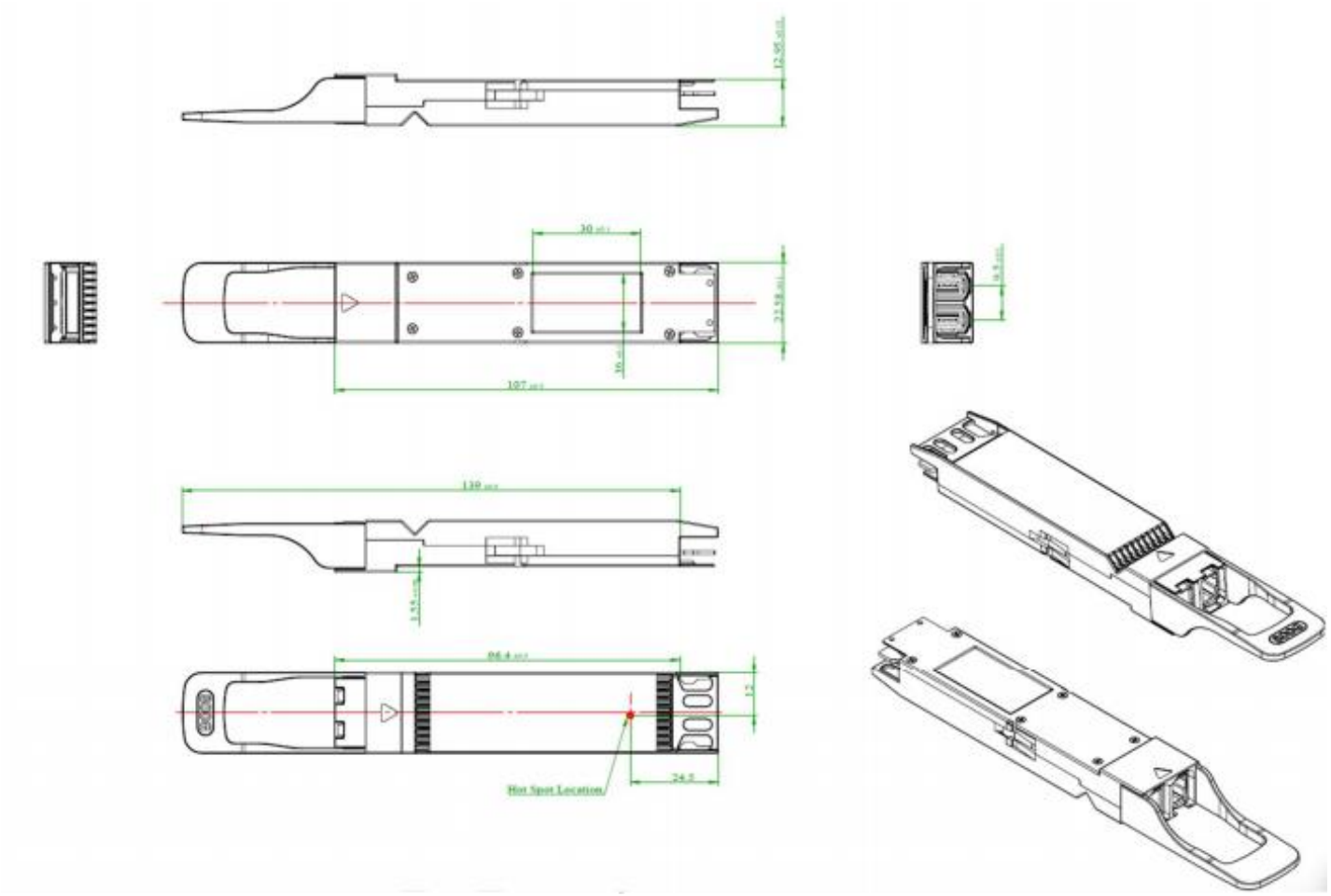
PIN ASSIGNMENT



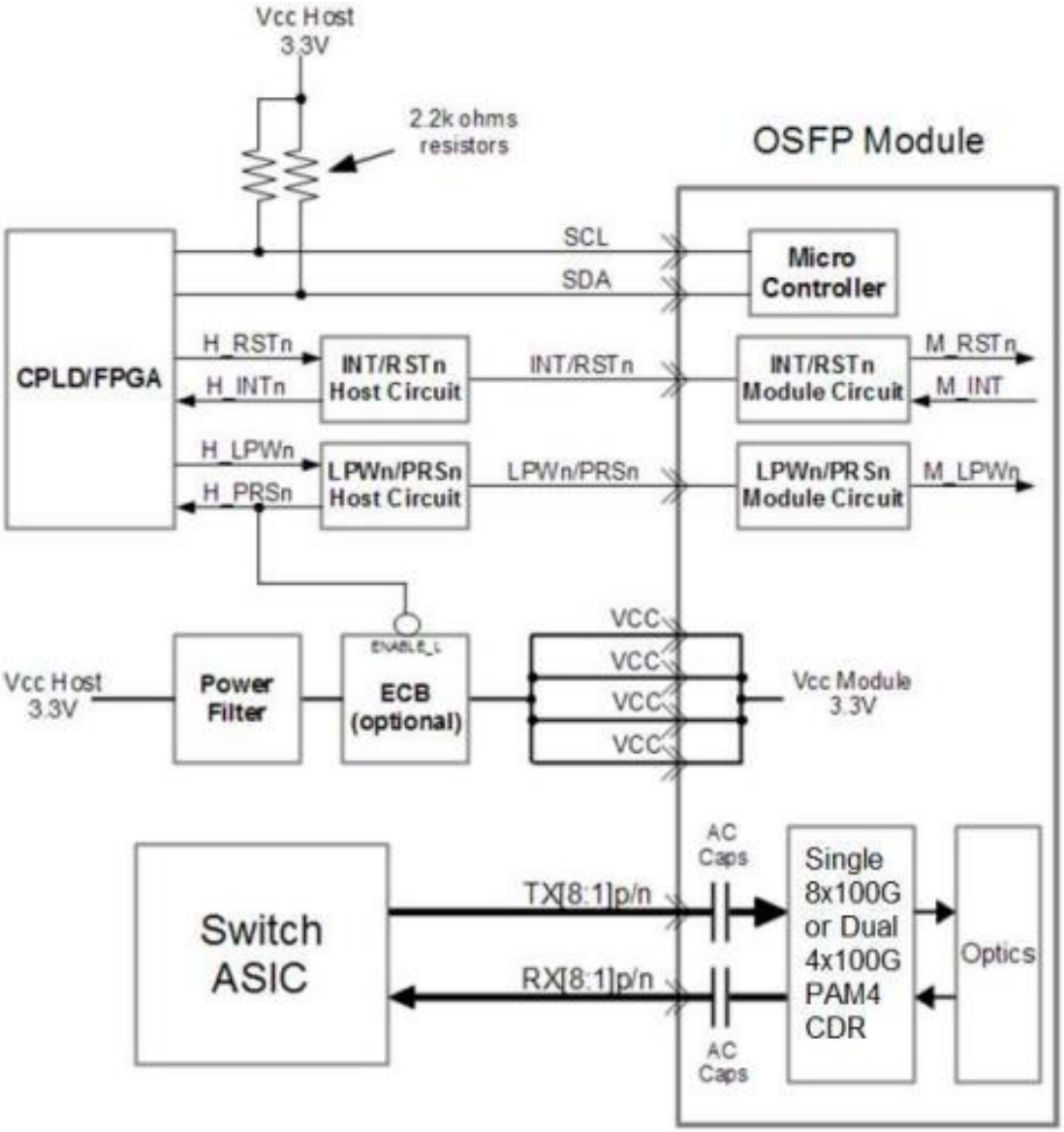
Pinout definitions of OSFP module inputs/outputs

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	LVCMOS-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/PRSn	Low-Power Mode / Module Present	**47**	LVCMOS-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	ºC	Internal
Voltage	0 to Vcc	0.1	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