



MMS4X00-NM-SKY

Mellanox® MMS4X00-NM Compatible 800GBase-DR8 PAM4 OSFP-IHS Transceiver (SMF, 1310nm, 500m, 2xMPO-12, DOM, CMIS 5.0)

Product Description

This Mellanox® MMS4X00-NM compatible OSFP-IHS Transceiver provides 800GBase-DR8 throughput up to 500m over single-mode fiber (SMF) PAM4 using a wavelength of 1310nm via a 2xMPO-12 connector. It can operate at temperatures between 0 and 70C. Our transceiver is built to meet or exceed OEM specifications and is guaranteed to be 100% compatible with Mellanox®. It has been programmed, uniquely serialized, and tested for data-traffic and application to ensure that it will initialize and perform identically. All of our transceivers comply with Multi-Source Agreement (MSA) standards to provide seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows access to real-time operating parameters. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

Skylane's transceivers are RoHS compliant and lead-free.

Features:

- OSFP MSA Compliant
- Supports 850Gbps
- 8x53.125GBd (PAM4) Electrical Interface
- Compliant with IEEE 802.3cu-2021: 8x100GBASE-DR optical interface
- Compliant with IEEE 802.3ck-2022: 8x100GAUI-1 C2M electrical interface
- Support both Ethernet and InfiniBand NDR
- EML transmitter and PIN PD receiver
- Commercial Temperature: 0 to 70 Celsius
- Class 1 Laser
- Dual MPO-12 Connector APC
- RoHS Compliant and Lead-Free

Applications:

- 8x100GBase Ethernet
- 2x400GBase Ethernet



For your product safety, please read the following information carefully before any manipulation of the transceiver:



ESD

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all others electrical input pins, tested per MIL-STD-883G, Method 3015.4 / JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module.



LASER SAFETY

This is a Class1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

The optical ports of the module need to be terminated with an optical connector or with a dust plug in order to avoid contamination.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	V _{CC}	-0.5		3.6	V	
Storage Temperature	T _{stg}	-40		85	°C	
Operating Case Temperature	T _c	0		70	°C	
Relative Humidity (non-condensing)	RH	5		95	%	
Data Input Voltage Differential	V _{DIP} -V _{DIN}			1	V	
Control Input Voltage	V _I	-0.3		V _{CC} +0.5	V	
Control Output Current	I _O	-20		20	mA	
Signaling Speed per Lane	DRL		53.125		GBd	
Operating Distance		2		500	m	

Notes:

- Exceeding the Absolute Maximum Ratings table may cause permanent damage to the device. This is just an emphasized rating and does not involve the functional operation of the device that exceeds the specifications of this technical specification under these or other conditions. Long-term operation under Absolute Maximum Ratings will affect the reliability of the device.

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
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	
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	
High-Speed Electrical Transmitter Characteristics (TP1)						
Differential Peak-Peak Input Voltage Tolerance		750			mV	
Peak-to-Peak AC Common-Mode Voltage Tolerance	Low-frequency, V _{CM_{LF}}			32	mV	
	Full-band, V _{CM_{FB}}			80	mV	
Differential-mode to common-mode return loss	RL _{cd}	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	
High-Speed Electrical Receiver Characteristics (TP4)						
Peak-to-Peak AC Common-Mode Voltage	Low-frequency, $V_{CM_{LF}}$			32	mV	
	Full-band, $V_{CM_{FB}}$			80	mV	
Differential Peak-to-Peak Output Voltage	Short Mode			600	mV	
	Long Mode			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	

Notes:

1. Compliant with IEEE802.3ck C2M.

Electrical Low Speed Control and Sense Signals Specifications

Parameter	Symbol	Min.	Max.	Unit	Notes
Module output SCL and SDA	VOL	0	0.4	V	
Module Input SCL and SDA	VIL	-0.3	$V_{CC} \cdot 0.3$	V	
	VIH	$V_{CC} \cdot 0.7$	$V_{CC} + 0.5$	V	
InitMode, ResetL and ModSelL	VIL	-0.3	0.8	V	
	VIH	2	$V_{CC} + 0.3$	V	
IntL	VOL	0	0.4	V	
	VOH	$V_{CC} - 0.5$	$V_{CC} + 0.3$	V	

Optical Characteristics

Parameter	Symbol	Min.	Typ.	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	AOPL	-2.9		4.0	dBm	1
Outer Optical Modulation Amplitude (OMA _{outer}), each Lane	TOMA	-0.8		4.2	dBm	
Launch power in OMA _{outer} Minus TDECQ, each lane	for extinction ratio ≥ 5 dB	TOMA-TDECQ	-2.2		dBm	
	for extinction ratio < 5 dB	TOMA-TDECQ	-1.9		dBm	
Transmitter and Dispersion Eye Closure for PAM4 (TDECQ), each lane	TDECQ			3.4	dB	
TDECQ – $10\log_{10}(\text{Ceq})$, each lane	Ceq			3.4	dB	
Average Launch Power of OFF Transmitter, each lane	TOFF			-15	dBm	
Extinction Ratio	ER	3.5			dB	
Transmitter Transition Time	Tr			17	ps	
RIN _{15,5} OMA	RIN			-136	dB/Hz	
Optical Return Loss Tolerance	ORL			15.5	dB	
Transmitter Reflectance	TR			-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 (OMA _{outer}), each Lane	OMA _R			4.2	dBm	
Receiver Reflectance	RR			-26	dB	
Receiver Sensitivity (OMA _{outer}), each Lane	SOMA			Max (-3.9, SECQ – 5.3)	dBm	3
Stressed Receiver Sensitivity (OMA _{outer}), 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 – $10\log_{10}(\text{Ceq})$, Lane Under Test	Ceq			3.4	dB	

Notes:

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 (OMA_{outer}), each lane (max) is informative and is defined for a transmitter with a value of SECQ up to 3.4dB.
4. Measured with conformance test signal at TP3 for the BER = 2.4×10^{-4} .

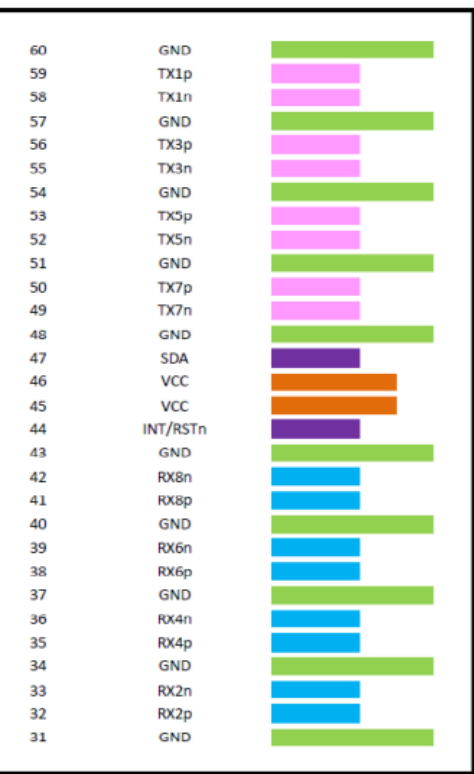
Pin Descriptions

Pin	Logic	Symbol	Name/Description	Notes
1		GND	Module Ground.	
2	CML-I	Tx2+	Transmitter Non-Inverted Data.	
3	CML-I	Tx2-	Transmitter Inverted Data.	
4		GND	Module Ground.	
5	CML-I	Tx4+	Transmitter Non-Inverted Data.	
6	CML-I	Tx4-	Transmitter Inverted Data.	
7		GND	Module Ground.	
8	CML-I	Tx6+	Transmitter Non-Inverted Data.	
9	CML-I	Tx6-	Transmitter Inverted Data.	
10		GND	Module Ground.	
11	CML-I	Tx8+	Transmitter Non-Inverted Data.	
12	CML-I	Tx8-	Transmitter Inverted Data.	
13		GND	Module Ground.	
14	LVC MOS-I/O	SCL	2-Wire Serial Interface Clock.	
15		Vcc	+3.3V Power Supply.	
16		Vcc	+3.3V Power Supply.	
17	Multi-Level	LPWn/PRSn	Low-Power Mode/Module Present.	
18		GND	Module Ground.	
19	CML-O	Rx7-	Receiver Inverted Data.	
20	CML-O	Rx7+	Receiver Non-Inverted Data.	
21		GND	Module Ground.	
22	CML-O	Rx5-	Receiver Inverted Data.	
23	CML-O	Rx5+	Receiver Non-Inverted Data.	
24		GND	Module Ground.	
25	CML-O	Rx3-	Receiver Inverted Data.	
26	CML-O	Rx3+	Receiver Non-Inverted Data.	
27		GND	Module Ground.	
28	CML-O	Rx1-	Receiver Inverted Data.	
29	CML-O	Rx1+	Receiver Non-Inverted Data.	
30		GND	Module Ground.	
31		GND	Module Ground.	
32	CML-O	Rx2+	Receiver Non-Inverted Data.	
33	CML-O	Rx2-	Receiver Inverted Data.	
34		GND	Module Ground.	
35	CML-O	Rx4+	Receiver Non-Inverted Data.	

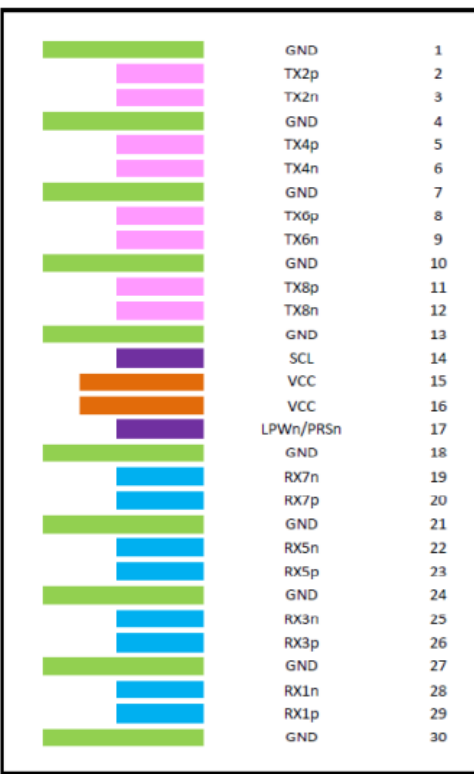
36	CML-O	Rx4-	Receiver Inverted Data.	
37		GND	Module Ground.	
38	CML-O	Rx6+	Receiver Non-Inverted Data.	
39	CML-O	Rx6-	Receiver Inverted Data.	
40		GND	Module Ground.	
41	CML-O	Rx8+	Receiver Non-Inverted Data.	
42	CML-O	Rx8-	Receiver Inverted Data.	
43		GND	Module Ground.	
44	Multi-Level	INT/RSTn	Module Input/Module Reset.	
45		Vcc	+3.3V Power Supply.	
46		Vcc	+3.3V Power Supply.	
47	LVC MOS-I/O	SDA	2-Wire Serial Interface Data.	
48		GND	Module Ground.	
49	CML-I	Tx7-	Transmitter Inverted Data.	
50	CML-I	Tx7+	Transmitter Non-Inverted Data.	
51		GND	Module Ground.	
52	CML-I	Tx5-	Transmitter Inverted Data.	
53	CML-I	Tx5+	Transmitter Non-Inverted Data.	
54		GND	Module Ground.	
55	CML-I	Tx3-	Transmitter Inverted Data.	
56	CML-I	Tx3+	Transmitter Non-Inverted Data.	
57		GND	Module Ground.	
58	CML-I	Tx1-	Transmitter Inverted Data.	
59	CML-I	Tx1+	Transmitter Non-Inverted Data.	
60		GND	Module Ground.	

Electrical Pad Layout

Top Side (viewed from top)

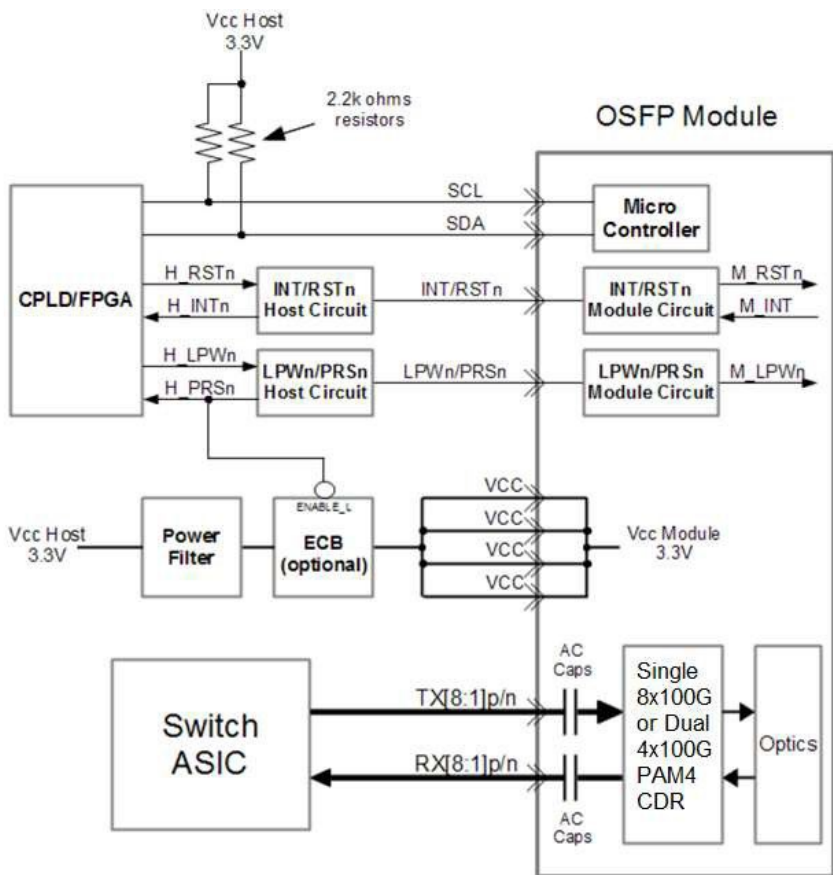


Bottom Side (viewed from bottom)

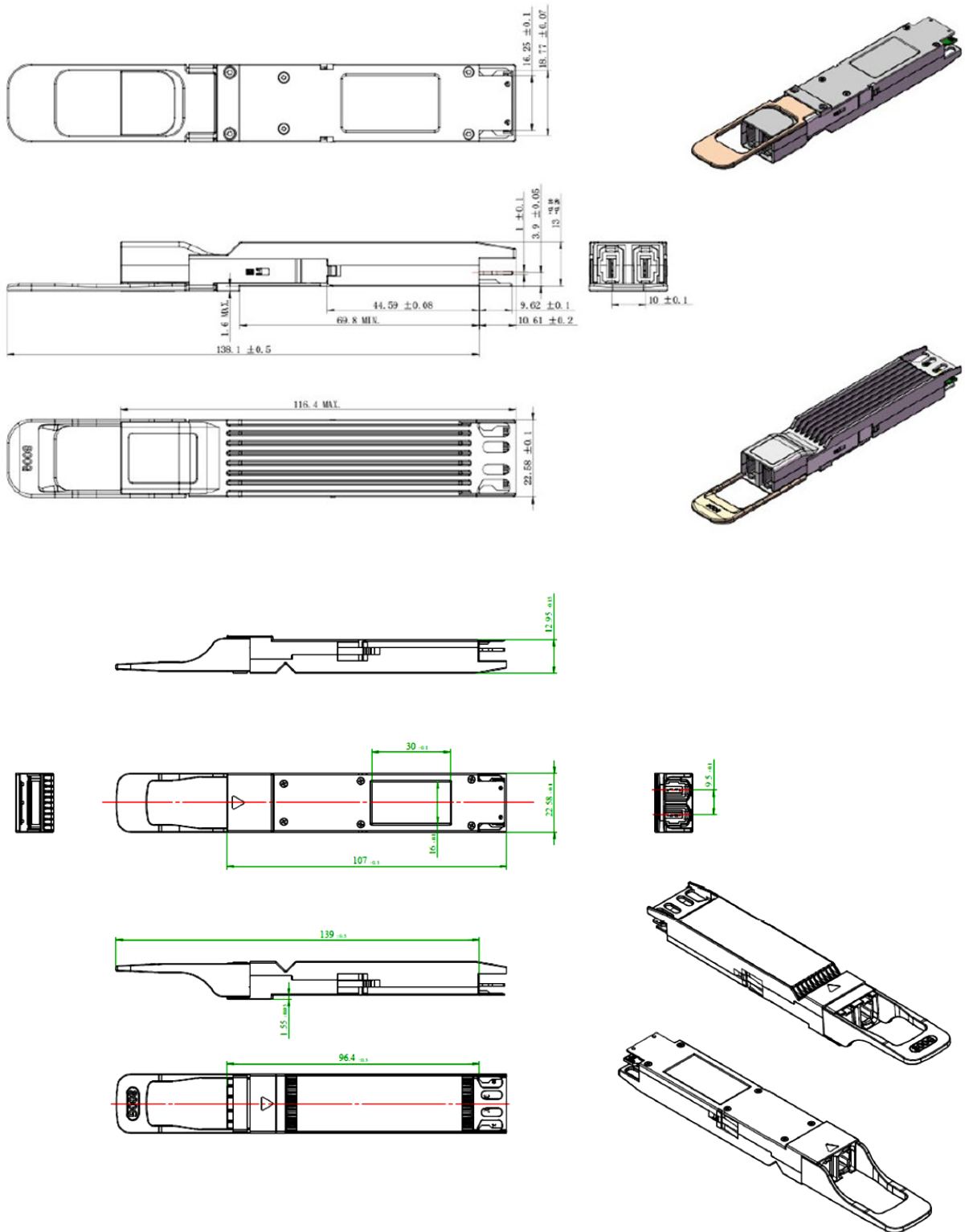


----- Module Card Edge -----

Recommended OSFP Host board Schematic



Mechanical Specifications



*Note: Both Heat Sink Exposed and Heat Sink Enclosed styles are OSFP Type 2 Compliant. Images are for Illustration purposes only. Product Labels, colors, and style may vary.

About Skylane Optics

Skylane is a leading provider of transceivers for optical communication.

We offer an extensive portfolio for the enterprise, access, datacenter and metropolitan fiber optical market as well as for smart home applications and home networks.

We cover the European, South American and North American market with a strong partner network and have offices in Belgium, Brazil, Sweden and USA.

Our offerings are characterized by high quality and performance. In combination with our strong technical support, we enable our customers to build cost optimized network solutions.

We offer an extensive range of high-quality products including transceivers (Optical and copper), Active Optical Cable (AOC), Direct Attach Cable (DAC), Mux/Demux, Coding Box.

