



MMS4X50-NM-SKY

Mellanox® MMS4X50-NM Compatible 800GBase-2xFR4 PAM4 OSFP-IHS Transceiver (SMF, 1310nm, 2km, 2xLC, DOM, CMIS 5.0)

Product Description

This Mellanox® MMS4X50-NM compatible OSFP-IHS Transceiver provides 800GBase-2xFR4 throughput up to 2km over single-mode fiber (SMF) PAM4 using a wavelength of 1310nm via a 2xLC connector. It can operate at temperatures between 0 and 70C. All of our transceivers are built to comply with Multi-Source Agreement (MSA) standards and are uniquely serialized and tested for data-traffic and application to ensure 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:

- Supports Both Ethernet and InfiniBand NDR
- 2x400GBASE-FR4 Optical Interface
- 2x400GAUI-4 C2M Electrical Interface
- InfiniBand NDR Electrical and Optical Interface
- Type 2 Housing with Dual LC Connector
- Support 850Gbps Aggregate Bit Rate
- I2C Management Interface Compliant to CMIS Rev5.0
- Class 1 Laser Certified
- Operating Temperature: 0 to 70 Celsius
- Hot-Pluggable OSFP Form Factor
- RoHS Compliant and Lead-Free



Applications:

- 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	Vcc	-0.5		3.6	V	
Storage Temperature	Tstg	-40		85	°C	
Operating Case Temperature	Tc	0		70	°C	1
Relative Humidity (Non-Condensing)	RH	5		95	%	
Maximum Power Dissipation	PDISS			16.5	W	
Maximum Power Dissipation (Low-Power Mode)	PDLP			2	W	
Signaling Speed Per Lane	DRL		53.125		GBd	
Operating Distance		2		2000	m	

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	Vcc	3.135	3.3	3.465	V	
Data Input Voltage Differential	IVdip-VdinI			1	V	
Control Input Voltage Differential	Vi	-0.3		Vcc+0.5	V	
Control Output Current	Io	-20		20	mA	
Instantaneous Peak Current at Hot Plug	Icc_IP			6600	mA	
Sustained Peak Current at Hot Plug	Icc_SP			5494.5	mA	
Control Input Voltage - High	VIH	Vcc*0.7		Vcc+0.3	V	
Control Input Voltage - Low	VIL	-0.3		Vcc*0.3	V	
2-Wire Serial Interface Clock Rate				400	kHz	
Power Supply Noise (1kHz to 1MHz Pk-Pk)				66	mVp-p	
Transmitter						
Differential Pk-Pk Input Voltage Tolerance (TP1a)		750			mV	
Pk-Pk AC Common-Mode Voltage Tolerance	Low-Frequency (VCMLF)			32	mV	
	Full-Band (VCMFB)			80		
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						
Pk-Pk AC Common-Mode Voltage	Low-Frequency (VCMLF)			32	mV	
	Full-Band (VCMFB)			80		

Differential Pk-Pk Output Voltage	Short-Mode				600	mV	
	Long-Mode				845		
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	
Low-Speed Control and Sense Signals							
Module Output SCL and SDA	VOL	0			0.4	V	
Module Input SCL and SDA	VIL	-0.3			Vcc*0.3	V	
	VIH	Vcc*0.7			Vcc+0.5	V	
InitMode, ResetL, and ModSelL	VIL	-0.3			0.8	V	
	VIH	2			Vcc+0.3	V	
IntL	VOL	0			0.4	V	
	VOH	Vcc-0.5			Vcc+0.3	V	

Optical Characteristics

Parameter	Symbol	Min.	Typ.	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	AOPT			10.4	dBm	
Average Launch Power Per Lane	AOPL	-3.2		4.4	dBm	1
Outer Optical Modulation Amplitude (OMA _{outer}) Per Lane	TDECQ<1.4dB	TOMA	-0.2	3.7	dBm	
	1.4dB≤TDECQ≤3.4dB		-1.6+TDECQ			
Difference in Launch Power Between Any Two Lanes (OMA _{outer})	AOPd			3.9	dB	
Transmitter and Dispersion Eye Closure for PAM4 (TDECQ) Per Lane	TDECQ			3.4	dB	
Transmitter Eye Closure for PAM4 (TECQ) Per Lane	TECQ			3.4	dB	
TDECQ – TECQ				2.5	dB	
Overshoot/Undershoot				22	%	

Transmitter Power Excursion				1.8	dBm	
Average Launch Power of Off Transmitter Per Lane		Toff		-16	dBm	
Extinction Ratio		ER	3.5		dB	
Transmitter Transition Time (Maximum)		Tr		17	ps	
RIN _{17.1} OMA (Maximum)		RIN		-136	dB/Hz	
Optical Return Loss Tolerance		ORL		17.1	dB	
Transmitter Reflectance		TR		-26	dB	2
Receiver						
Wavelength L0, L4		λC0, λC4	1264.5	1271	1277.5	nm
Wavelength L1, L5		λC1, λC5	1284.5	1291	1297.5	nm
Wavelength L2, L6		λC2, λC6	1304.5	1311	1317.5	nm
Wavelength L3, L7		λC3, λC7	1324.5	1331	1337.5	nm
Damage Threshold Per Lane		AOPD	5.4		dBm	
Average Receive Power Per Lane		AOPR	-7.2		dBm	
Receive Power (OMAouter) Per Lane		OMAR			3.7	dBm
Difference in Receive Power Between Any Two Lanes (OMAouter) Maximum		AOPg			4.1	dB
Receiver Reflectance		RR			-26	dB
Receiver Sensitivity (OMAouter) Per Lane	TECQ<1.4dB	SOMA			-4.6	dBm
	1.4dB≤TECQ≤3.4dB				-6+TECQ	
Stressed Receiver Sensitivity (OMAouter) Per Lane		SRS			-2.6	dBm
Stressed Eye Closure for PAM4 (SECQ) Per Lane Under Test				3.4	dB	
OMAouter of Each Aggressor Lane				1.4	dBm	

Notes:

1. Average launch power, per lane (minimum) is informative and not the principal indicator of signal strength.
2. Transmitter reflectance is defined looking into the transmitter.
3. Measured with conformance test signal at TP3 for the BER=2.4x10⁻⁴.

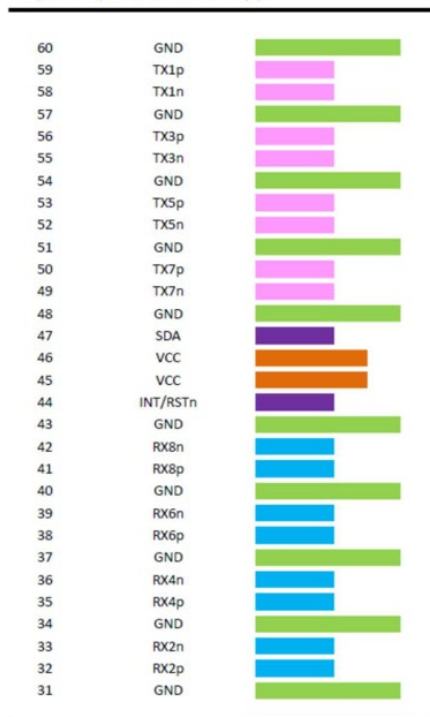
Pin Descriptions

Pin	Logic	Symbol	Name/Description	Notes
1		GND	Module Ground.	
2	CML-I	Tx2+	Transmitter Data Non-Inverted.	
3	CML-I	Tx2-	Transmitter Data Inverted.	
4		GND	Module Ground.	
5	CML-I	Tx4+	Transmitter Data Non-Inverted.	
6	CML-I	Tx4-	Transmitter Data Inverted.	
7		GND	Module Ground.	
8	CML-I	Tx6+	Transmitter Data Non-Inverted.	
9	CML-I	Tx6-	Transmitter Data Inverted.	
10		GND	Module Ground.	
11	CML-I	Tx8+	Transmitter Data Non-Inverted.	
12	CML-I	Tx8-	Transmitter Data Inverted.	
13		GND	Module Ground.	
14	LVC MOS-I/O	SCL	2-Wire Serial Interface Clock.	
15		Vcc	+3.3V Power.	
16		Vcc	+3.3V Power.	
17	Multi-Level	LPWn/PRSn	Low-Power Mode/Module Present.	
18		GND	Module Ground.	
19	CML-O	Rx7-	Receiver Data Inverted.	
20	CML-O	Rx7+	Receiver Data Non-Inverted.	
21		GND	Module Ground.	
22	CML-O	Rx5-	Receiver Data Inverted.	
23	CML-O	Rx5+	Receiver Data Non-Inverted.	
24		GND	Module Ground.	
25	CML-O	Rx3-	Receiver Data Inverted.	
26	CML-O	Rx3+	Receiver Data Non-Inverted.	
27		GND	Module Ground.	
28	CML-O	Rx1-	Receiver Data Inverted.	
29	CML-O	Rx1+	Receiver Data Non-Inverted.	
30		GND	Module Ground.	
31		GND	Module Ground.	
32	CML-O	Rx2+	Receiver Data Non-Inverted.	
33	CML-O	Rx2-	Receiver Data Inverted.	
34		GND	Module Ground.	
35	CML-O	Rx4+	Receiver Data Non-Inverted.	
36	CML-O	Rx4-	Receiver Data Inverted.	
37		GND	Module Ground.	
38	CML-O	Rx6+	Receiver Data Non-Inverted.	
39	CML-O	Rx6-	Receiver Data Inverted.	

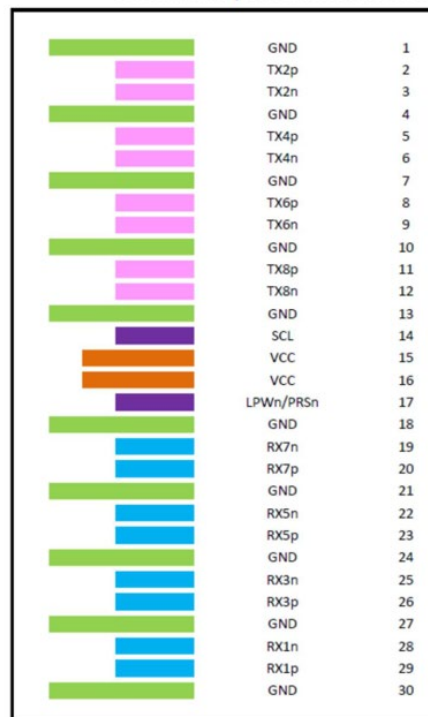
40		GND	Module Ground.	
41	CML-O	Rx8+	Receiver Data Non-Inverted.	
42	CML-O	Rx8-	Receiver Data Inverted.	
43		GND	Module Ground.	
44	Multi-Level	INT/RSTn	Module Interrupt/Module Reset.	
45		Vcc	+3.3V Power.	
46		Vcc	+3.3V Power.	
47	LVC MOS-I/O	SDA	2-Wire Serial Interface Data.	
48		GND	Module Ground.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

Electrical Pad Layout

Top Side (viewed from top)

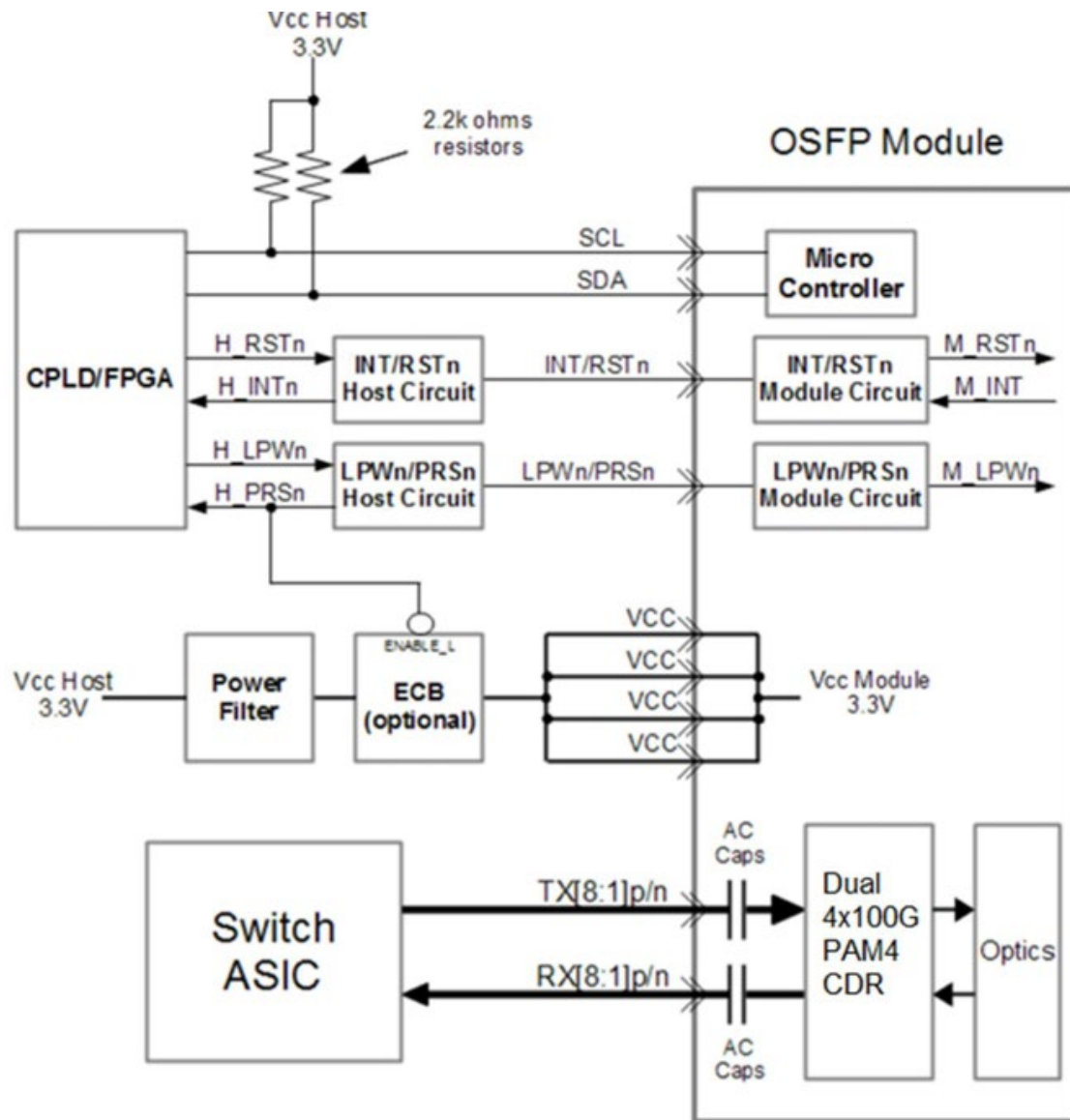


Bottom Side (viewed from bottom)

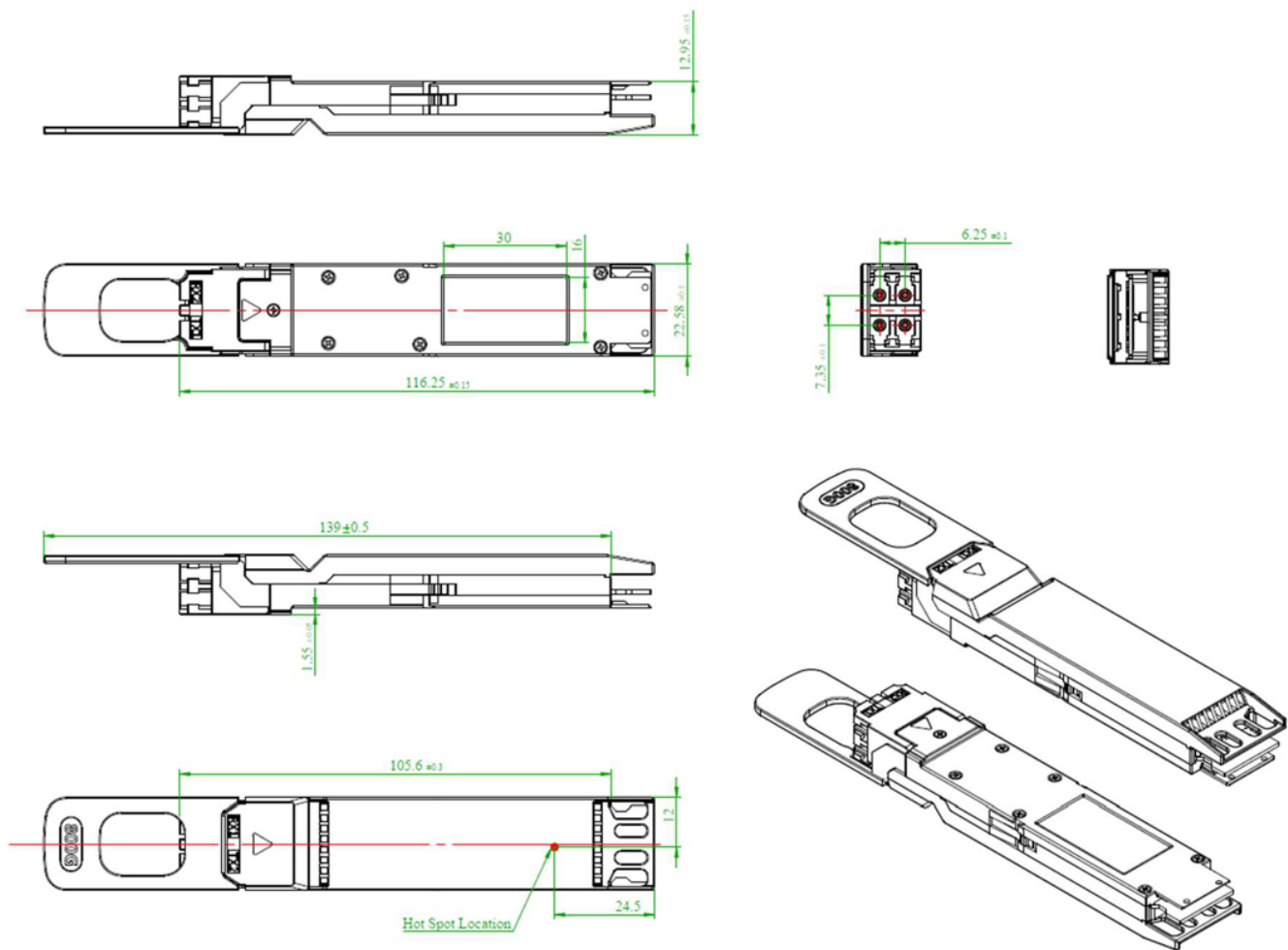


----- Module Card Edge -----

Recommended Host Board Schematic



Mechanical Specifications



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.

