



OSFPRHS-400GB-VR4-VDM-MX-SKY

Mellanox® Compatible 400GBase-VR4 PAM4 OSFP112 RHS Transceiver (MMF, 850nm, 50m, MPO-12, DOM, CMIS 5.2, VDM)

Product Description

This Mellanox® compatible OSFP112 RHS transceiver provides 400GBase-VR4 throughput up to 50m over multi-mode fiber (MMF) using a wavelength of 850nm via a MPO-12 connector with VDM. 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:

- 4 x100Gbps MMF Optical Interface
- Up to 50m Link on OM4 Multi-Mode Fiber
- Each Electrical Channel Data Rate Up to 53.125Gbaud w/CDR
- CML Compatible Electrical I/O
- OSFP MSA Compliant
- 850nm VCSEL and PD Array Technology
- MPO-12 APC Optical Receptacle Type
- CMIS 5.2 Compliant
- Operating Temperature: 15 to 70 Celsius
- Hot-Pluggable
- RoHS Compliant and Lead-Free



Applications:

- 400GBase Ethernet
- CMIS Versatile Diagnostic Monitoring (VDM) enabled

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.	Max.	Unit	Notes
Storage Temperature	Tstg	-40	+85	°C	
Relative Humidity – Storage	RHs	0	85	%	1
Relative Humidity – Operating	RHo	0	85	%	1
Module Supply Voltage	Vcc	-0.5	3.6	V	

Notes:

1. RH is a non-condensing condition.
2. Exceeding the Absolute Maximum Ratings may cause irreversible damage to the device. The device is not intended to be operated under the condition of simultaneous Absolute Maximum Ratings, a condition which may cause irreversible damage to the device.

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Case Temperature	Tc	15	25	70	°C	1
Module Supply Voltage	Vcc	3.135	3.3	3.465	V	
Power Consumption	P			10	W	2
Module Supply Current	I _{IN}		2424		mA	
Electrical Signal Rate	Se		53.125		GBd	3
Optical Signal Rate	So		53.125		GBd	3

Notes:

1. Temperature range = C.
2. Power Class 5.
3. ±100ppm, each lane.

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Signaling Rate	SR		53.125		GBd	1
Tx_Data Differential Input Voltage	VIN			900	mV	
Tx_Data Differential Input Impedance	ZIN		100		Ω	
Receiver						
Signaling Rate	SR		53.125		GBd	1
Rx_Data Differential Output Voltage	VOUT			900	mV	
Rx_Data Differential Output Impedance	ZOUT		100		Ω	

Notes:

1. ± 100 ppm, each lane.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Signaling Rate	SR		53.125		GBd	1
Modulation Format	MF	PAM4				
Center Wavelength	λ	840		870	nm	
RMS Spectral Width	$\Delta\lambda$			0.65	nm	
Average Launch Power	POUT	-4.6		4	dBm	2
Outer Optical Modulation Amplitude	For Max. (TECQ, TDECQ) ≤ 1.8 dB	OMAouter	-2.6		3.5	dBm
	For $1.8 \leq$ Max. (TECQ, TDECQ) ≤ 4.4 dB		-4.4 + Max. (TECQ, TDECQ)			
Transmitter and Dispersion Eye Closure for PAM4	TDECQ			4.4	dB	2
Transmitter Eye Closure for PAM4 (TECQ)	TECQ			4.4	dB	2
Over/Under-Shoot	O/Ushoot			29	%	2
Transmitter Power Excursion	TPE			2.3	dB	2
Extinction Ratio	ER	2.5			dB	2
Transmitter Transition Time	Time			17	ps	2
Average Launch Power of Off Transmitter	Poff			-30	dBm	2
RIN ₁₄ OMA	RIN ₁₄ OMA			-132	dB/Hz	
Optical Return Loss Tolerance	ORLT			14	dB	
Encircled Flux	EF	$\geq 86\%$ at $19\mu\text{m}$ $\leq 30\%$ at $4.5\mu\text{m}$				

Receiver						
Signaling Rate	SR		53.125		GBd	1
Modulation Format	MF	PAM4				
Center Wavelength	λ	842		948	nm	
Damage Threshold	PDamage	5			dBm	
Average Receive Power	PIN	-6.3		4	dBm	3
Receive Power (OMAOuter)	PIN(OMAOuter)			3.5	dBm	2
Receiver Reflectance	RF			-15	dB	
Receiver Sensitivity (OMAOuter)	For $TECQ \leq 1.8dB$	Sens(OMAOuter)			-4.4	dBm
	For $1.8B \leq TECQ \leq 3.4dB$				-6.2+TECQ	
Stressed Receiver Sensitivity (OMAOuter) Per Lane	Stressed-Sens (OMAOuter)			-1.8	dBm	4

Notes:

1. $\pm 100ppm$, each lane.
2. Each lane.
3. Each lane. Average receive power, per lane (minimum), is not the principal indicator of signal strength. A received power below this value cannot be compliant; however, a value above this does not ensure compliance.
4. Each lane. BER @ $2.4E^{-4}$.

Pin Descriptions

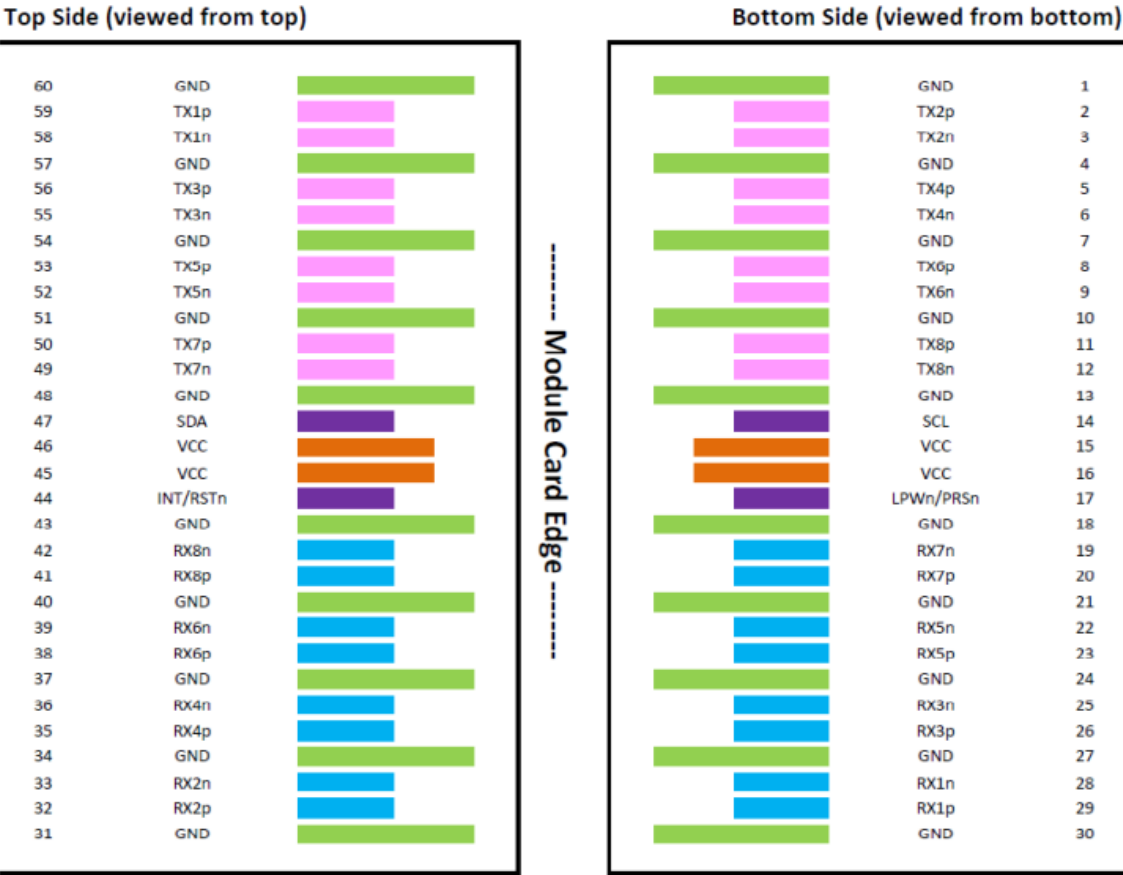
Pin	Logic	Symbol	Name/Description	Direction	Plug Sequence	Notes
1		GND	Module Ground.		1	
2	CML-I	Tx2p	CH2 Transmitter Non-Inverted Data.	Input from Host	3	
3	CML-I	Tx2n	Ch2 Transmitter Inverted Data.	Input from Host	3	
4		GND	Module Ground.		1	
5	CML-I	Tx4p	CH4 Transmitter Non-Inverted Data.	Input from Host	3	
6	CML-I	Tx4n	CH4 Transmitter Inverted Data.	Input from Host	3	
7		GND	Module Ground.		1	
8	CML-I	Tx6p	Not Connected.	Input from Host	3	
9	CML-I	Tx6n	Not Connected.	Input from Host	3	
10		GND	Module Ground.		1	
11	CML-I	Tx8p	Not Connected.	Input from Host	3	
12	CML-I	Tx8n	Not Connected.	Input from Host	3	
13		GND	Module Ground.		1	
14	LVC MOS-I/O	SCL	2-Wire Serial Interface Clock.	Bi-Directional	3	1
15		Vcc	+3.3V Power Supply.	Power from Host	2	
16		Vcc	+3.3V Power Supply.	Power from Host	2	
17	Multi-Level	LPWn/PRSn	Low-Power Mode/Module Present.	Bi-Directional	3	2
18		GND	Module Ground.		1	
19	CML-O	Rx7n	Not Connected.	Output from Host	3	
20	CML-O	Rx7p	Not Connected.	Output from Host	3	
21		GND	Module Ground.		1	
22	CML-O	Rx5n	Not Connected.	Output from Host	3	
23	CML-O	Rx5p	Not Connected.	Output from Host	3	
24		GND	Module Ground.		1	
25	CML-O	Rx3n	CH3 Receiver Inverted Data.	Output from Host	3	
26	CML-O	Rx3p	CH3 Receiver Non-Inverted Data.	Output from Host	3	
27		GND	Module Ground.		1	
28	CML-O	Rx1n	CH1 Receiver Inverted Data.	Output from Host	3	
29	CML-O	Rx1p	CH1 Receiver Non-Inverted Data.	Output from Host	3	
30		GND	Module Ground.		1	
31		GND	Module Ground.		1	
32	CML-O	Rx2p	CH2 Receiver Non-Inverted Data.	Output from Host	3	
33	CML-O	Rx2n	CH2 Receiver Inverted Data.	Output from Host	3	
34		GND	Module Ground.		1	
35	CML-O	Rx4p	CH4 Receiver Non-Inverted Data.	Output from Host	3	

36	CML-O	Rx4n	CH4 Receiver Inverted Data.	Output from Host	3	
37		GND	Module Ground.		1	
38	CML-O	Rx6p	Not Connected.	Output from Host	3	
39	CML-O	Rx6n	Not Connected.	Output from Host	3	
40		GND	Module Ground.		1	
41	CML-O	Rx8p	Not Connected.	Output from Host	3	
42	CML-O	Rx8n	Not Connected.	Output from Host	3	
43		GND	Module Ground.		1	
44	Multi-Level	INT/RSTn	Module Input/Module Reset.	Bi-Directional	3	3
45		Vcc	+3.3V Power Supply.	Power from Host	2	
46		Vcc	+3.3V Power Supply.	Power from Host	2	
47	LVC MOS-I/O	SDA	2-Wire Serial Interface Data.	Bi-Directional	3	1
48		GND	Module Ground.		1	
49	CML-I	Tx7n	Not Connected.	Input from Host	3	
50	CML-I	Tx7p	Not Connected.	Input from Host	3	
51		GND	Module Ground.		1	
52	CML-I	Tx5n	Not Connected.	Input from Host	3	
53	CML-I	Tx5p	Not Connected.	Input from Host	3	
54		GND	Module Ground.		1	
55	CML-I	Tx3n	CH3 Transmitter Inverted Data.	Input from Host	3	
56	CML-I	Tx3p	CH3 Transmitter Non-Inverted Data.	Input from Host	3	
57		GND	Module Ground.		1	
58	CML-I	Tx1n	Ch1 Transmitter Inverted Data.	Input from Host	3	
59	CML-I	Tx1p	CH1 Transmitter Non-Inverted Data.	Input from Host	3	
60		GND	Module Ground.		1	

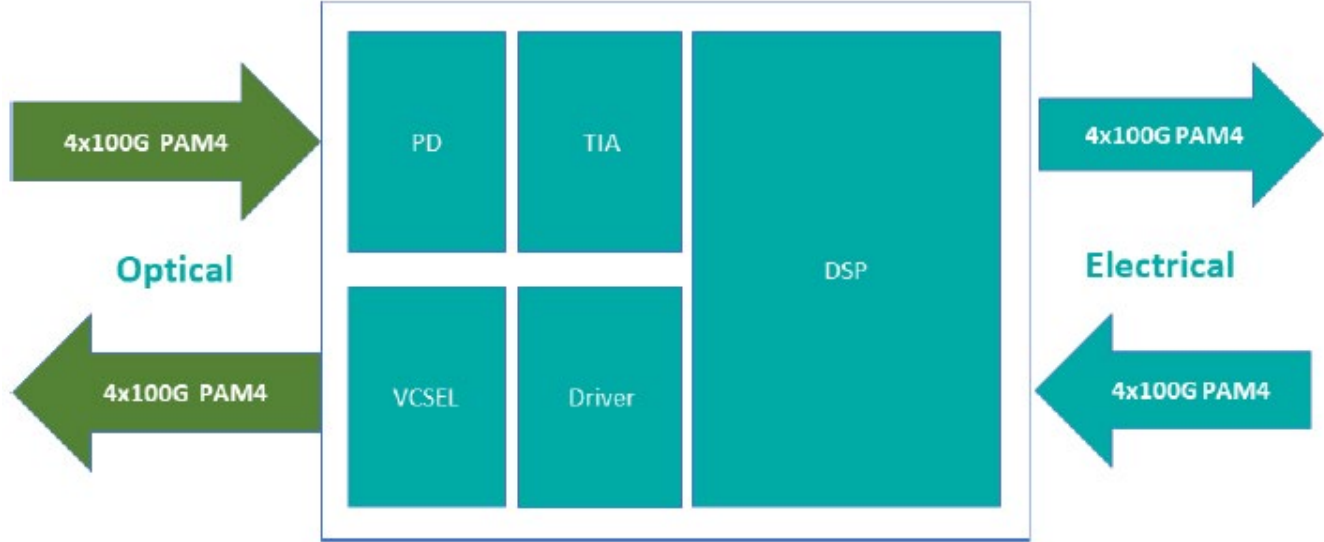
Notes:

1. Open-drain with pull-up resistor on the host.
2. LPWn/PRSn is a dual function signal that allows the host to signal low-power mode and allows the module to indicate that the module is present.
3. INT/RSTn is a dual function signal that allows the module to raise an interrupt to the host and allows the host to reset the module.

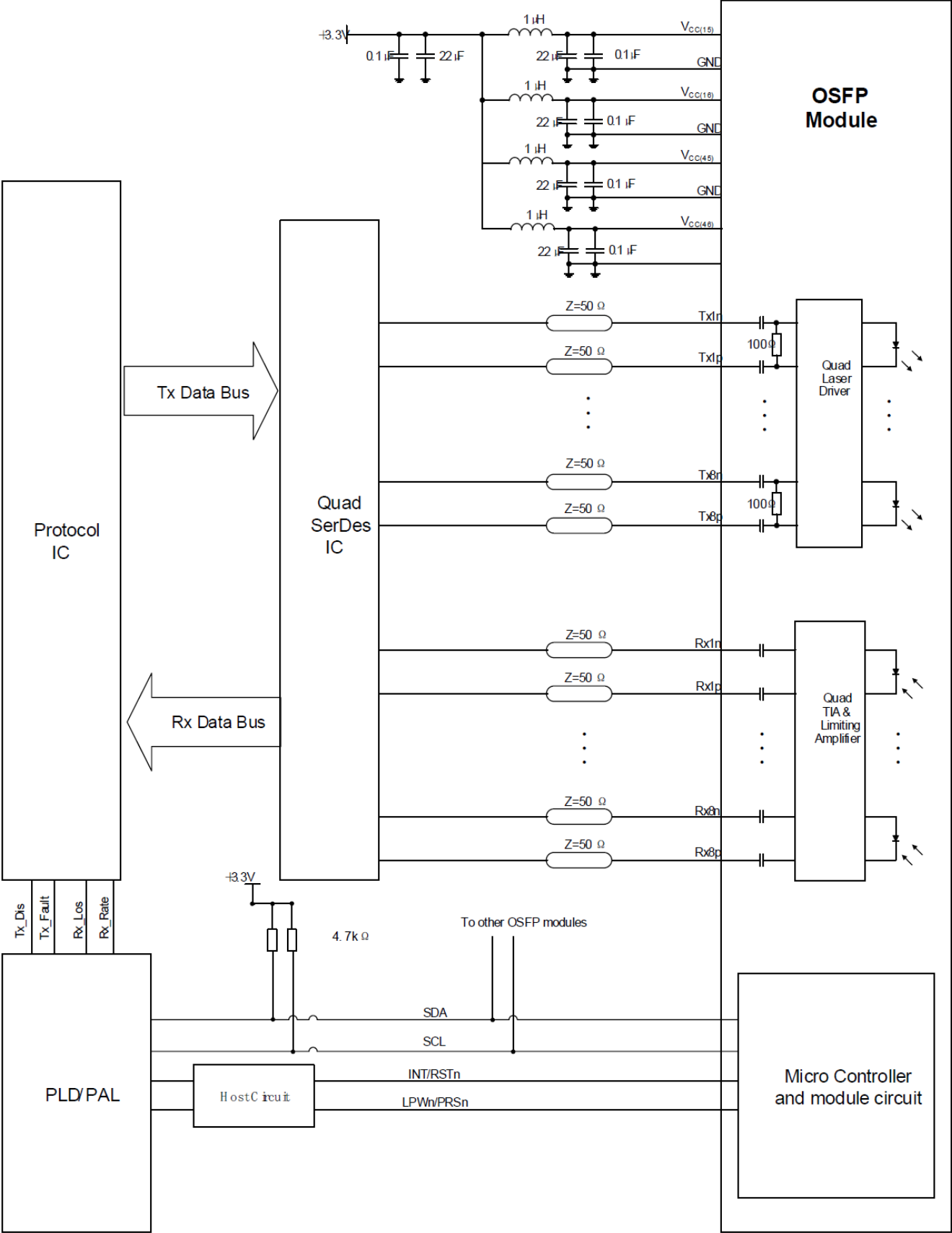
Pin Assignment



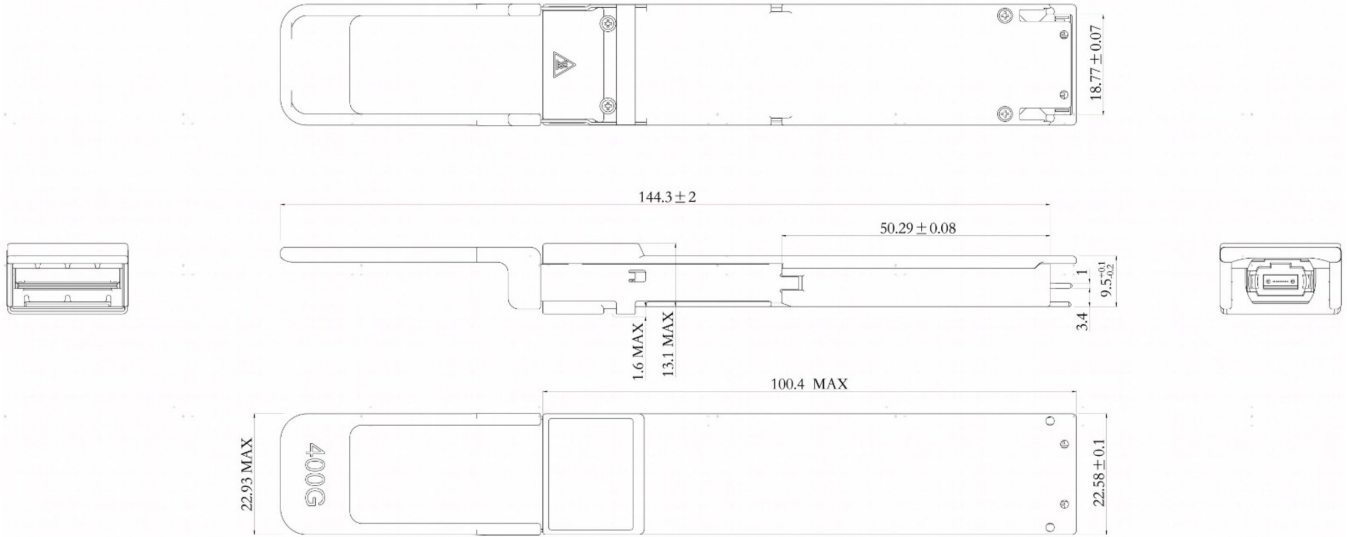
Transceiver Block Diagram



Electrical Interface



Mechanical Specifications



Notes:

1. Tolerance: ± 0.1 mm.
2. Others according with OSFP MSA or customer specifications.
3. Optical port according to fiber connector 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.

