QSFP112-400GB-FR4-VDM-MX-SKY

Mellanox® Compatible 400GBase-FR4 QSFP112 Transceiver (SMF, 1310nm, 2km, LC, DOM, CMIS 5.2, VDM)

Product Description

This Mellanox® compatible QSFP112 transceiver provides 400GBase-FR4 throughput up to 2km over single-mode fiber (SMF) using a wavelength of 1310nm via an LC 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 Independent Electrical Input/Output Channels
- Hot-Pluggable
- LC Optical Connector
- Cooled CWDM4 EML/PIN PD Array
- QSFP112 MSA Compatible Electrical I/O
- 2km Link Over SMF
- CMIS 5.2 Compliant
- +3.3V Power Supply
- Operating Temperature: 0 to 70 Celsius
- IEEE 802.3cu CL 151 Compliant
- RoHS Compliant and Lead-Free



Applications:

- 400GBase Ethernet
- CMIS Versatile Diagnostic Monitoring (VDM) Enabled
- HPC Interconnect, Data Centers, & Cloud Networks

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 Ambient Temperature	Tstg	-40	+85	°C	
Relative Humidity – Storage	RHs	15	85	%	1
Relative Humidity – Operating	RHo	15	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
PAM4 Signaling Rate Per Lane	Rate		53.125		GBaud	1
Operating Case Temperature	Tc	0	+25	70	°C	2
Module Supply Voltage	Vcc	3.135	3.3	3.465	V	
Power Consumption	PC			10	W	

Notes:

1. Range: ± 100ppm.
2. Temperature range = C.

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Signaling Rate Per Lane		53.125 ± 100ppm			GBaud	
Tx_Data Differential Input Voltage	VIN			900	mV	
Tx_Data Differential Input Impedance	ZIN	90	100	110	Ω	
Receiver						
Signaling Rate Per Lane		53.125 ± 100ppm			GBaud	
Rx_Data Differential Output Voltage	VOUT			900	mV	
Rx_Data Differential Output Impedance	ZOUT	90	100	110	Ω	

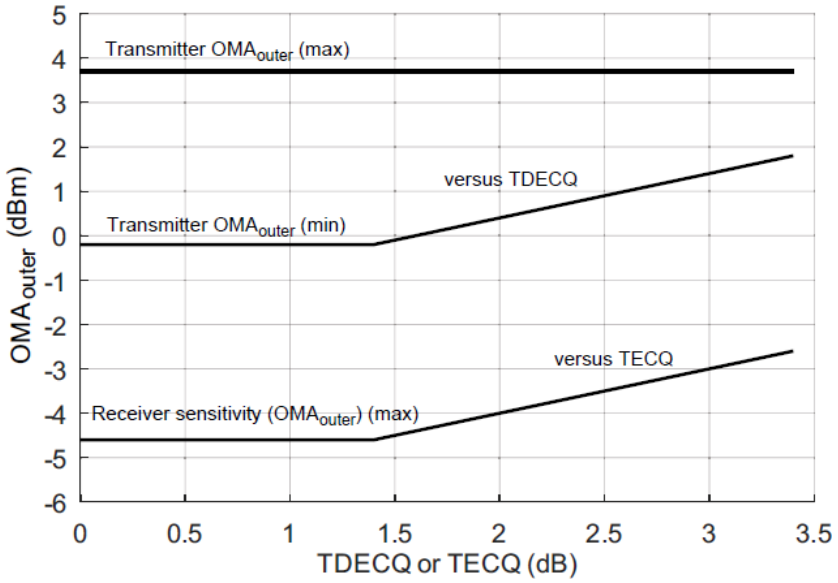
Optical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter							
PAM4 Signaling Rate Per Lane				53.125		GBaud	1
Transmitter Type			CWDM EML				
Average Total Optical Power		PTotal			10.4	dBm	
Average Launch Power Per Lane		POUT	-3.2		4.4	dBm	2
Optical Output w/ Tx Off Per Lane		Poff			-16	dBm	
Center Wavelength Each Lane		λ	1264.5		1277.5	nm	
			1284.5		1297.5		
			1304.5		1317.5		
			1324.5		1337.5		
Extinction Ratio Per Lane (Minimum)		ER	3.5			dB	
OMAouter Per Lane (Maximum)		OMA			3.7	dBm	
Outer Optical Modulation Amplitude (OMAouter) Per Lane Minimum	**For TDECQ < 1.4dB**	OMA	-0.2			dBm	
	For 1.4dB ≤ TDECQ < 3.4dB		TDECQ-1.6				
Transmitter Power Excursion (Maximum)					1.8	dBm	
Optical Return Loss Tolerance (Maximum)		ORL			17.1	dB	
Side-Mode Suppression Ratio (Minimum)		SMSR	30			dB	
Transmitter and Dispersion Eye Closure for PAM4 Per Lane (Maximum)		TDECQ			3.4	dB	
$RIN_{17.1}OMA$					-136	dB/Hz	
Transmitter Reflectance (Maximum)		TR			-26	dB	
Receiver							
Receiver Type			CWDM and PIN/TIA				
Damage Threshold Per Lane		THd	5.4			dBm	
Receiver Sensitivity OMAouter Per Lane	**For TECQ < 1.4dB**	PIN			-4.6	dBm	3
	For 1.4dB ≤ TECQ ≤ 3.4dB				-6+TECQ		
Receive Power Per Lane (OMAouter) (Maximum)		PINouter			3.7	dBm	
Average Receive Power Per Lane		P	-7.2		4.4	dBm	4
Receiver Reflectance		RR			-26	dB	
Difference in Receive Power Between Any Two Lanes (OMAouter) (Maximum)		Pdif			4.1	dB	
Center Wavelength		λ	1264.5		1277.5	nm	5
			1284.5		1297.5		
			1304.5		1317.5		
			1324.5		1337.5		

Rx_LOS of Signal - Assert	LOSA	-20			dBm	
Rx_LOS of Signal - De-Assert	LOSD			-9	dBm	

Notes:

1. Range: ± 100ppm.
2. Average optical output.
3. Pre-FEC BER < $1E^{-6}$. The values for receiver sensitivity (OMAouter), per lane (maximum), vary depending on the value of TECQ for the test source used for measurement.
4. Average receive power, per lane (minimum), is informative and not the principal indicator of signal strength. A receive power below this value can't be compliant; however, a value above this does not ensure compliance.
5. For each optical port.
6. Transmitter OMAouter per lane versus TDECQ and receiver sensitivity (OMAouter) per lane versus TECQ for 400GBASE-FR4.

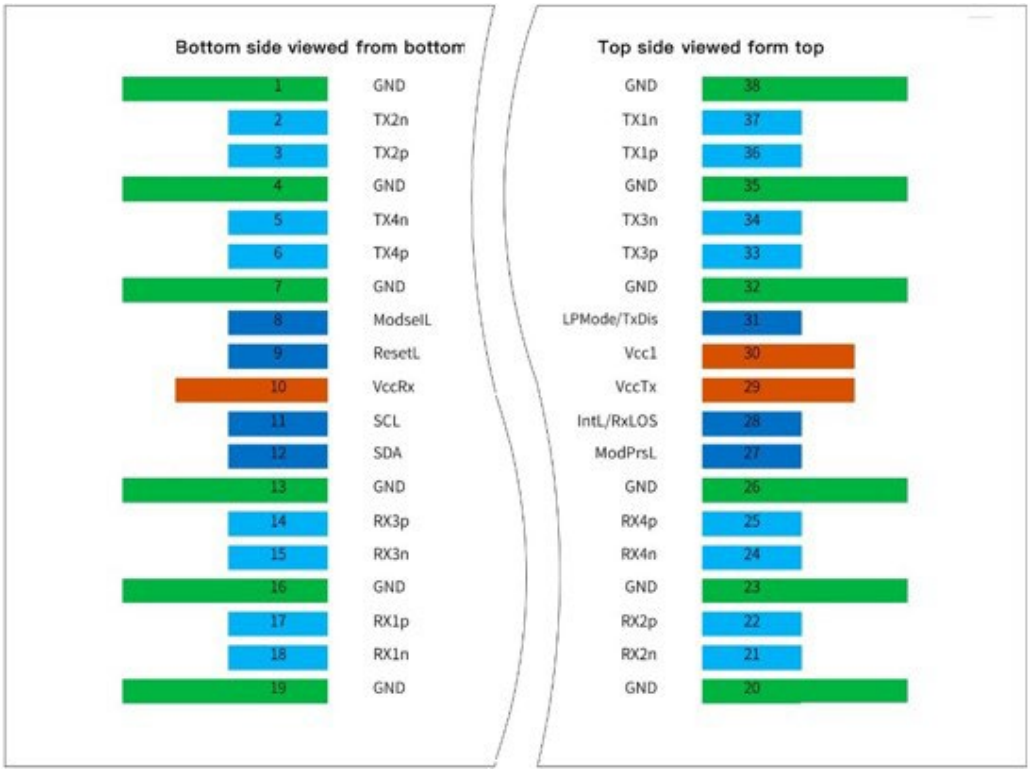


Pin Descriptions

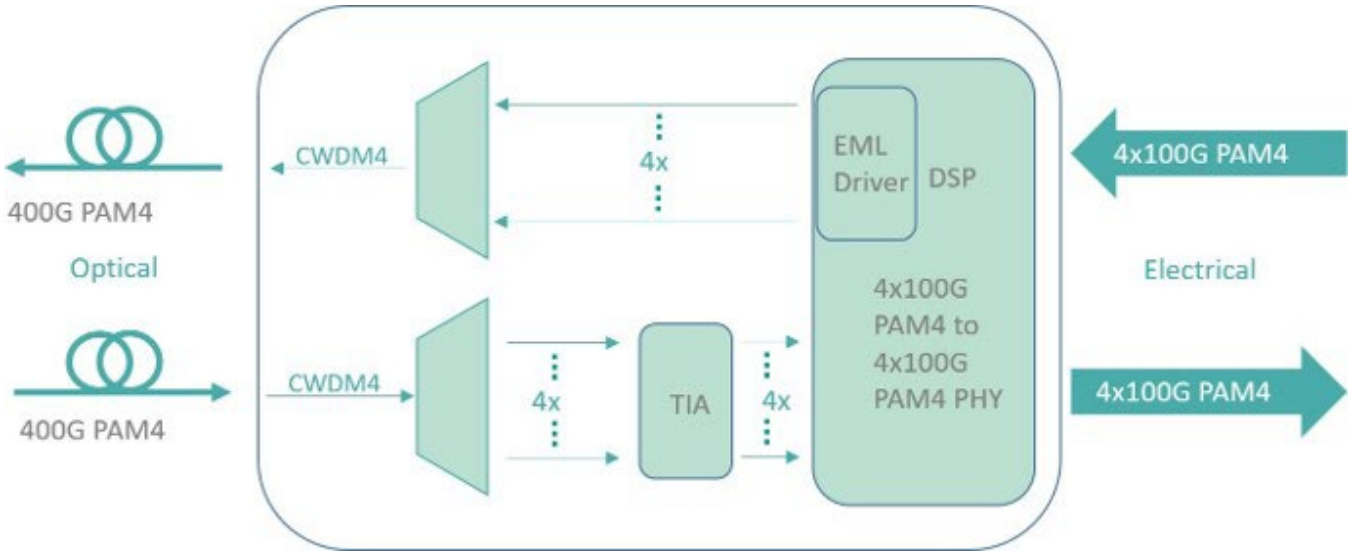
Pin	Symbol	Name/Description	Notes
1	GND	Module Ground.	
2	TX2n	Transmitter Inverted Data Input.	
3	TX2p	Transmitter Non-Inverted Data Input.	
4	GND	Module Ground.	
5	TX4n	Transmitter Inverted Data Input.	
6	TX4p	Transmitter Non-Inverted Data Input.	
7	GND	Module Ground.	
8	ModSelL	Module Select.	
9	ResetL	Reset.	
10	VccRx	+3.3 V Power supply receiver.	
11	SCL	2-wire serial interface clock.	
12	SDA	2-wire serial interface data.	
13	GND	Module Ground.	
14	RX3p	Receiver Non-Inverted Data Output.	
15	RX3n	Receiver Inverted Data Output.	
16	GND	Module Ground.	
17	RX1p	Receiver Non-Inverted Data Output.	
18	RX1n	Receiver Inverted Data Output.	
19	GND	Module Ground.	
20	GND	Module Ground.	
21	RX2n	Receiver Inverted Data Output.	
22	RX2p	Receiver Non-Inverted Data Output.	
23	GND	Module Ground.	
24	RX4n	Receiver Inverted Data Output.	
25	RX4p	Receiver Non-Inverted Data Output.	
26	GND	Module Ground.	
27	ModPrsL	Present.	
28	IntL/RxLOS	Interrupt/optional RxLOS.	
29	VccTx	+3.3 V Power supply transmitter.	
30	Vcc1	+3.3 V Power Supply.	
31	LPMode/TxDis	Low Power Mode/optional TX Disable.	
32	GND	Module Ground.	
33	TX3p	Transmitter Non-Inverted Data Input.	
34	TX3n	Transmitter Inverted Data Input.	
35	GND	Module Ground.	

36	TX1p	Transmitter Non-Inverted Data Input.	
37	TX1n	Transmitter Inverted Data Input.	
38	GND	Module Ground.	

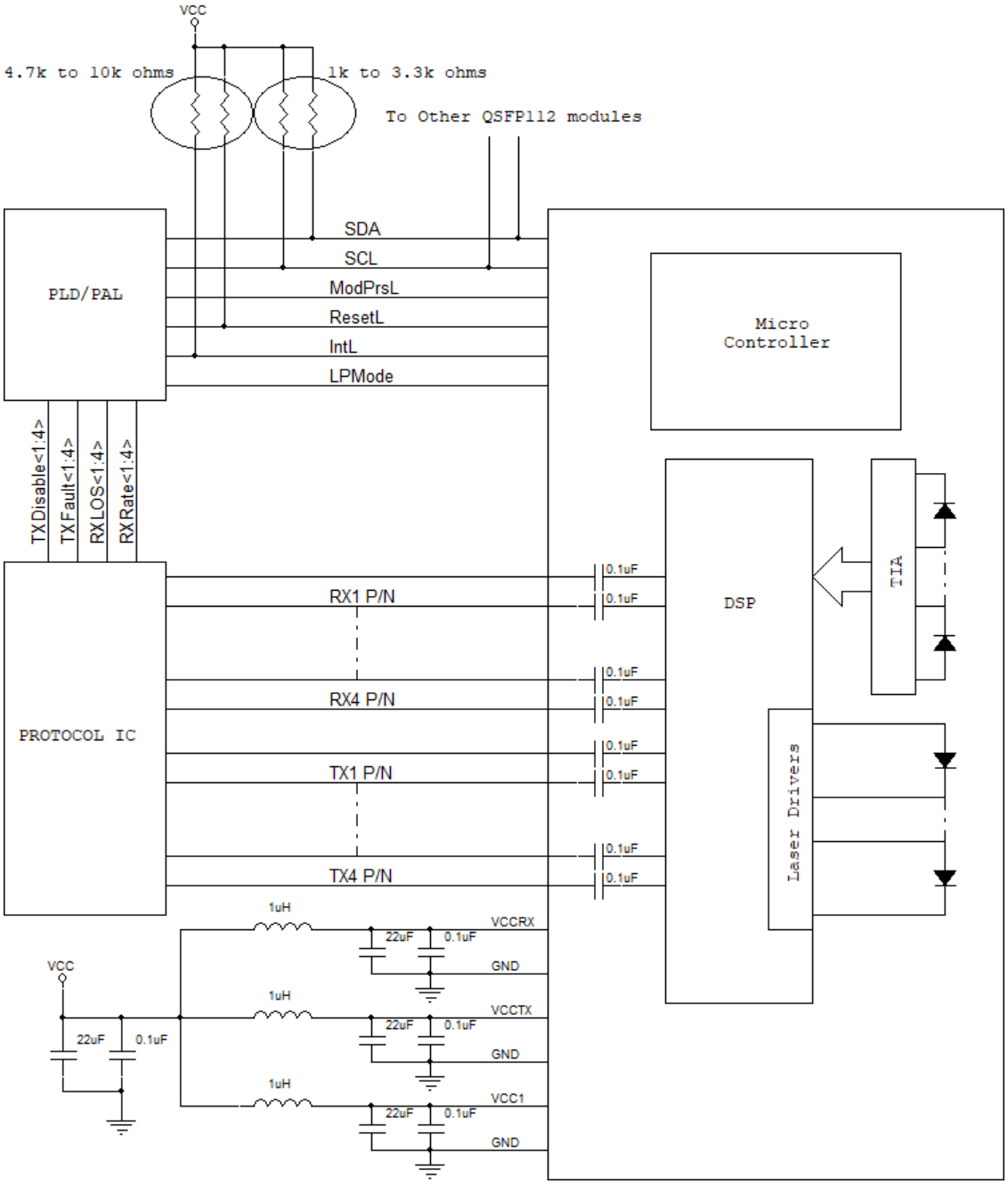
Pin Assignments



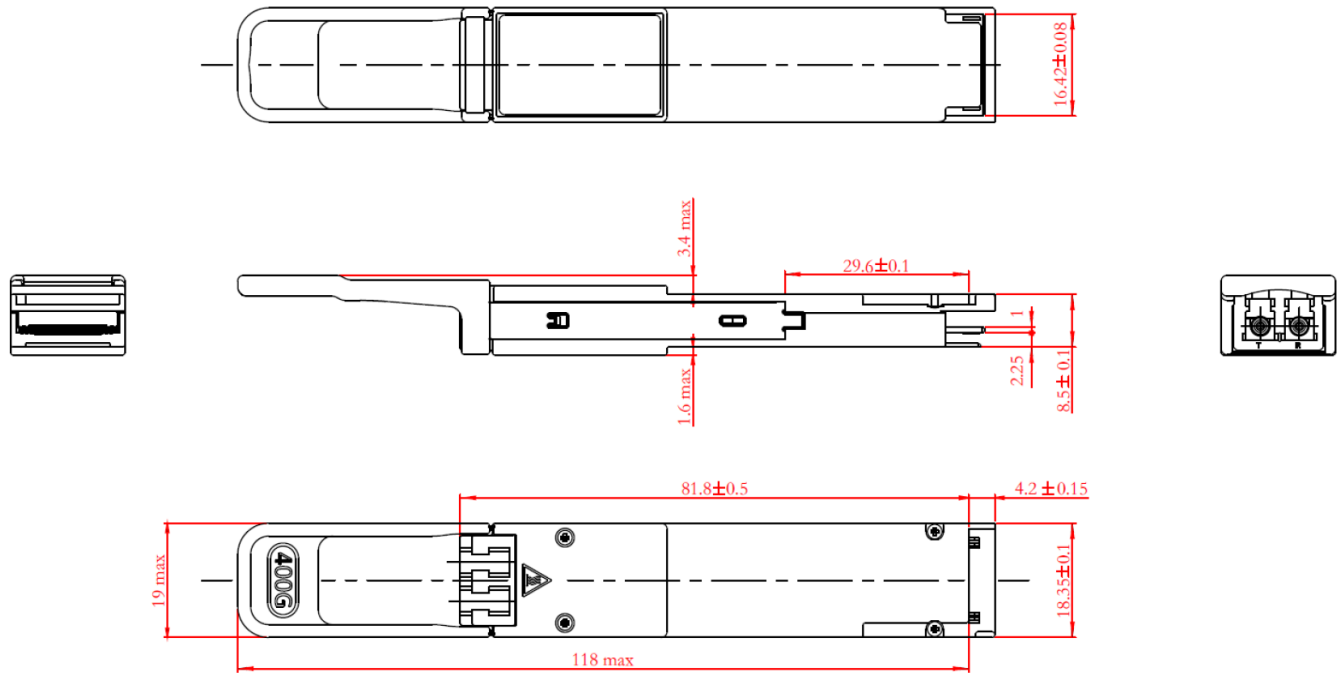
Transceiver Block Diagram



Host Board and Module Board Diagram



Mechanical Specifications



Notes:

1. Tolerance: ± 0.1mm.
2. Others according with QSFP112 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.