



QDD4-400GB-DR4-SKY

MSA Compliant 400GBase-DR4 QSFP-DD Transceiver (SMF, 1310nm, 500m, MPO, DOM, CMIS 4.0)

Product Description

This MSA compliant QSFP-DD transceiver provides 400GBase-DR4 throughput up to 500m over single-mode fiber (SMF) using a wavelength of 1310nm via an MPO connector. 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:

- Compliant with IEEE802.3bs Standard: 400GAUI-8 Electrical Interface
- QSFP-DD MSA Compliant
- Compliant with IEEE 802.3bs Standard: 400GBASE-DR4 Optical Interface
- CMIS 4.0
- Class 1 Laser
- MPO-12 Connector
- RoHS Compliant and Lead-Free
- Operating Temperature: 0 to 70 Celsius
- RoHS compliant and Lead Free



Applications:

- 400GBase 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
Storage Temperature	Tstg	-40		85	°C	
Operating Case Temperature	Tc	0	25	70	°C	
Supply Voltage	Vcc	-0.5		3.6	V	
Relative Humidity	RH	5		95	%	
Operating Distance		2		500	m	
Signaling Speed Per Lane	DRL		53.125		GBd	PAM4
Maximum Power Dissipation	PD			9	W	
Maximum Power Dissipation (Low-Power Mode)	PDLP			2	W	
Rx Differential Data Output Load			100		Ω	

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	V _{CC}	3.135	3.3	3.465	V	
Control Input Voltage	V _I	-0.3		V _{CC} +0.5	V	
Instantaneous Peak Current at Hot Plug	I _{CC_IP}			3600	mA	
Sustained Peak Current at Hot Plug	I _{CC_SP}			2970	mA	
2-Wire Serial Interface Clock Rate				400	kHz	
Power Supply Noise (10Hz-10MHz)				66	mVp-p	
Transmitter - Module Input						
Differential Pk-Pk Input Voltage Tolerance		900			mV	
Differential Termination Mismatch				10	%	
Single-Ended Voltage Tolerance Range		-0.4		3.3	V	
DC Common-Mode Voltage		-350		2850	mV	
Receiver - Module Output						
AC Common-Mode Output Voltage (RMS)				17.5	mV	
Differential Output Voltage				900	mV	
Differential Near-End Eye Height		70			mV	
Differential Far-End Eye Height		30			mV	
Far-End Pre-Cursor Ratio		-4.5		2.5	%	
Differential Termination Mismatch				10	%	
Transition Time (Minimum, 20-80%)		9.5			ps	
DC Common-Mode Voltage		-350		2850	mV	
Low-Speed Control and Sense Signals						
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	

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Center Wavelength	λ_C	1304.5	1311	1317.5	nm	
Side-Mode Suppression Ratio	SMSR	30			dB	
Average Launch Power Per Lane	P	-2.9		4.0	dBm	1
Outer Optical Modulation Amplitude (OMA _{outer}) Per Lane	TOMA	-0.8		4.2	dBm	2
Launch Power in OMA _{outer} Minus TDECQ Per Lane	TOMA	-2.2			dBm	
Transmitter and Dispersion Eye Closure for PAM4 (TDECQ) Per Lane	TDECQ			3.4	dB	
TDECQ-TECQ 10log10 (Ceq)				3.4	dB	
Average Launch Power of Off Transmitter Per Lane	T _{off}			-15	dBm	
Extinction Ratio Per Lane	ER	3.5			dB	
Transmitter Transition Time				17	ps	
RIN _{21.4OMA}	RIN			-136	dB/Hz	
Optical Return Loss Tolerance	ORLT			21.4	dB	
Transmitter Reflectance	TR			-26	dB	3
Receiver						
Center Wavelength	λ_C	1304.5	1311	1317.5	nm	
Damage Threshold Per Lane		5			dBm	
Average Receiver Power Per Lane	P _{avg}	-5.9		4.0	dBm	1
Receive Power Per Lane (OMA _{outer})				4.2	dBm	
Receiver Reflectance	RR			-26	dB	
Receiver Sensitivity Per Lane (OMA _{outer})	SOMA			-4.4	dBm	2
Stressed Receiver Sensitivity Per Lane (OMA _{outer})	SRS			-1.9	dBm	3
Conditions of Stressed Receiver Sensitivity Test						
Stressed Eye Closure for PAM4 (SECQ) Per Lane Under Test			3.4		dB	
SECQ -10log10 (Ceq) Per Lane Under Test				3.4	dB	
OMA _{outer} of Each Aggressor Lane			4.2		dBm	

Notes:

1. Average launch power, per lane (minimum), is informative and not the principal indicator of signal strength.
2. Even if TDECQ < 1.4dB, OMA_{outer} (minimum) must exceed this value.
3. Transmitter reflectance is defined looking into the transmitter.
4. Average receive power, per lane (minimum), is informative and not the principal indicator of signal strength.
5. Receiver sensitivity (OMA_{outer}), per lane (maximum), is informative and is defined for a transmitter with a value of SECQ up to 3.4dB.

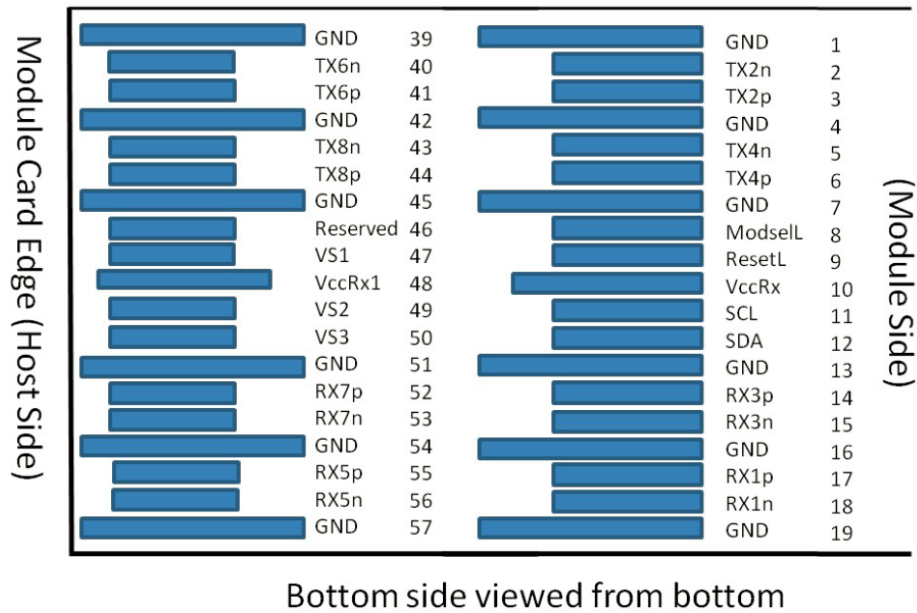
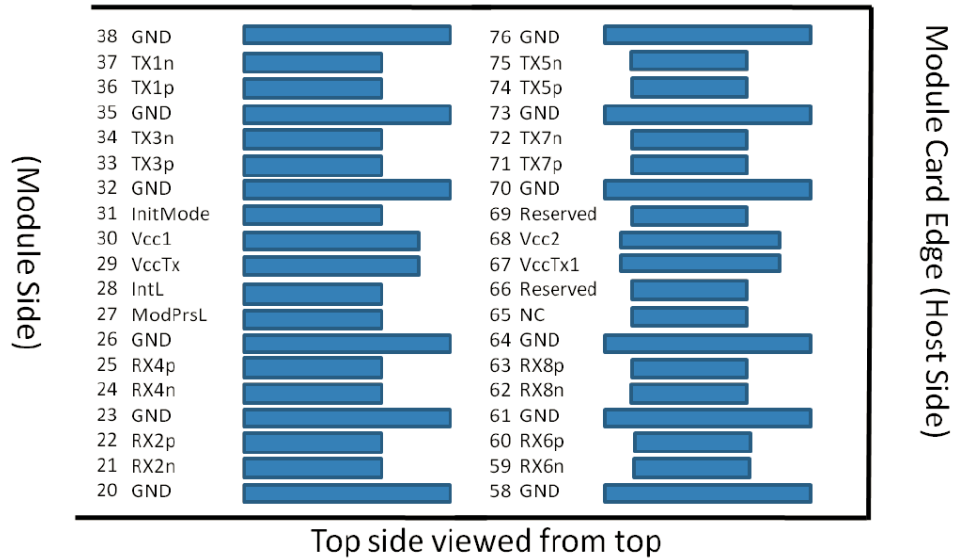
6. Measured with conformance test signals at TP3 for the $BER=2.4 \times 10^{-4}$.

Pin Descriptions

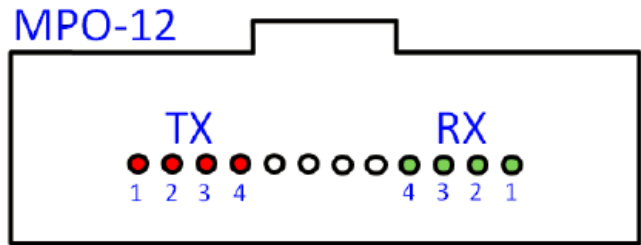
Pin	Logic	Symbol	Name/Description	Notes
1		GND	Module Ground.	
2	CML-I	Tx2-	Transmitter Inverted Data Input.	
3	CML-I	Tx2+	Transmitter Non-Inverted Data Input.	
4		GND	Module Ground.	
5	CML-I	Tx4-	Transmitter Inverted Data Input.	
6	CML-I	Tx4+	Transmitter Non-Inverted Data Input.	
7		GND	Module Ground.	
8	LVTTTL-I	ModSelL	Module Select.	
9	LVTTTL-I	ResetL	Module Reset.	
10		VccRx	+3.3V Receiver Power Supply.	
11	LVCNOS-I/O	SCL	2-Wire Serial Interface Clock.	
12	LVCNOS-I/O	SDA	2-Wire Serial Interface Data.	
13		GND	Module Ground.	
14	CML-O	Rx3+	Receiver Non-Inverted Data Output.	
15	CML-O	Rx3-	Receiver Inverted Data Output.	
16		GND	Module Ground.	
17	CML-O	Rx1+	Receiver Non-Inverted Data Output.	
18	CML-O	Rx1-	Receiver Inverted Data Output.	
19		GND	Module Ground.	
20		GND	Module Ground.	
21	CML-O	Rx2-	Receiver Inverted Data Output.	
22	CML-O	Rx2+	Receiver Non-Inverted Data Output.	
23		GND	Module Ground.	
24	CML-O	Rx4-	Receiver Inverted Data Output.	
25	CML-O	Rx4+	Receiver Non-Inverted Data Output.	
26		GND	Module Ground.	
27	LVTTTL-O	ModPrsL	Module Present.	
28	LVTTTL-O	IntL	Interrupt	
29		VccTx	+3.3V Transmitter Power Supply.	
30		Vcc1	+3.3V Power Supply.	
31	LVTTTL-I	InitMode	Initialization Mode.	
32		GND	Module Ground.	
33	CML-I	Tx3+	Transmitter Non-Inverted Data Input.	
34	CML-I	Tx3-	Transmitter Inverted Data Input.	
35		GND	Module Ground.	
36	CML-I	Tx1+	Transmitter Non-Inverted Data Input.	
37	CML-I	Tx1-	Transmitter Inverted Data Output.	
38		GND	Module Ground.	

39		GND	Module Ground.	
40	CML-I	Tx6-	Transmitter Inverted Data Input.	
41	CML-I	Tx6+	Transmitter Non-Inverted Data Input.	
42		GND	Module Ground.	
43	CML-I	Tx8-	Transmitter Inverted Data Input.	
44	CML-I	Tx8+	Transmitter Non-Inverted Data Input.	
45		GND	Module Ground.	
46		Reserved		
47		VS1	Module Vendor-Specific 1.	
48		VccRx1	+3.3V Receiver Power Supply.	
49		VS2	Module Vendor-Specific 2.	
50		VS3	Module Vendor-Specific 3.	
51		GND	Module Ground.	
52	CML-O	Rx7+	Receiver Non-Inverted Data Output.	
53	CML-O	Rx7-	Receiver Inverted Data Output.	
54		GND	Module Ground.	
55	CML-O	Rx5+	Receiver Non-Inverted Data Output.	
56	CML-O	Rx5-	Receiver Inverted Data Output.	
57		GND	Module Ground.	
58		GND	Module Ground.	
59	CML-O	Rx6-	Receiver Inverted Data Output.	
60	CML-O	Rx6+	Receiver Non-Inverted Data Output.	
61		GND	Module Ground.	
62	CML-O	Rx8-	Receiver Inverted Data Output.	
63	CML-O	Rx8+	Receiver Non-Inverted Data Output.	
64		GND	Module Ground.	
65		NC	Not Connected.	
66		Reserved		
67		VccTx1	+3.3V Transmitter Power Supply.	
68		Vcc2	+3.3V Power Supply.	
69		Reserved		
70		GND	Module Ground.	
71	CML-I	Tx7+	Transmitter Non-Inverted Data Input.	
72	CML-I	Tx7-	Transmitter Inverted Data Input.	
73		GND	Module Ground.	
74	CML-I	Tx5+	Transmitter Non-Inverted Data Input.	
75	CML-I	Tx5-	Transmitter Inverted Data Input.	
76		GND	Module Ground.	

Electrical Pin-Out Details



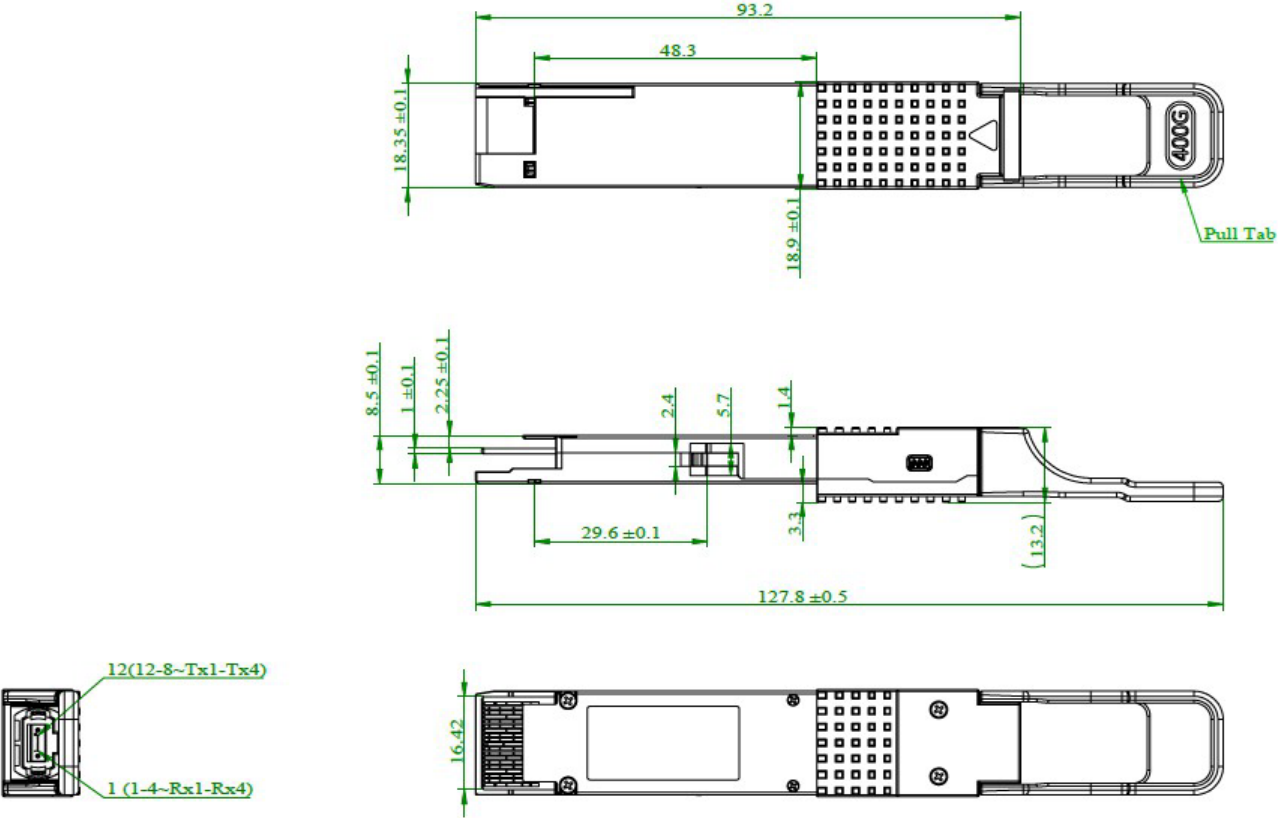
Active Fiber Ports in MPO-12 Connector on Module Side



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.

