

QDD-400GB-DR4-LP-2-C

MSA and TAA 400GBase-DR4 QSFP-DD Transceiver Low Power (SMF, 1310nm, 2km, MPO, DOM)

Features:

- Compliant with IEEE Std 802.3bs
- Compliant with 802.3cu 100G FR1 Optical Specifications
- QSFP-DD MSA Compliant
- CMIS 4.0
- MPO-12 Connector
- 1310nm EML Laser
- 8x26.5625GBd PAM4 Electrical Interface
- Single +3.3V Power Supply
- Operating Temperature: 0 to 70 Celsius
- RoHS Compliant and Lead-Free



Applications:

- 400G Ethernet

Product Description

This MSA compliant QSFP-DD transceiver provides 400GBase-DR4 throughput up to 2km over single-mode fiber (SMF) using a wavelength of 1310nm via an MPO 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. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

ProLabs' transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S.-made or designated country end products.")



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	25	70	°C	
Relative Humidity	RH	0		85	%	
Data Rate	DR		53.125		Gbps	
Modulation Format		PAM4				

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	Vcc	3.135	3.3	3.465	V	
Power Supply Current	Icc			2.55	A	
Power Dissipation	PD			8	W	
Transmitter						
Input Differential Impedance	ZIN		100		Ω	
Differential Data Input Swing	VIN,pp	180		900	mVp-p	
Receiver						
Output Differential Impedance	ZOUT		100		Ω	
Differential Data Output Swing	VOUT,pp	300		850	mVp-p	1
Transition Time (20-80%)	Tr/Tf	9.5			ps	

Notes:

1. Internally AC coupled but requires an external 100Ω differential load termination.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Center Wavelength	λ	1304.5		1317.5	nm	
Side-Mode Suppression Ratio	SMSR	30			dB	
Average Launch Power Per Lane	P	-3.1		4	dBm	
Outer Optical Modulation Amplitude Per Lane	OMA _{outer}	-0.1		4.2		
OMA Minus TDECQ		-1.5			dBm	
Transmitter and Dispersion Penalty Eye Closure for PAM4 Per Lane	TDECQ			3.4	dB	
Extinction Ratio	ER	3.5			dB	
Average Launch Power of Off Transmitter	P _{off}			-15	dBm	
Optical Return Loss Tolerance	ORLT			21.4	dB	
Transmitter Reflectance				-26	dB	
Receiver						
Receiver Wavelength	λ	1304.5		1317.5	nm	
Receiver Sensitivity Per Lane (OMA _{outer})				-4.5	dBm	1
Damage Threshold	Pol	5			dBm	
Average Receiver Sensitivity	P _{avg}	-7.1		4	dBm	
Receive Power Per Lane (OMA _{outer})	OMA			4.2	dBm	
Optical Reflectance	OR			-26	dB	
LOS De-Assert	LOSD			-10	dBm	
LOS Assert	LOSA	-16			dBm	
LOS Hysteresis		0.5			dB	

Notes:

1. Measured with a PRBS31Q test pattern @53.125GBd with PAM4 modulation and BER<2.4E⁻⁴.

Pin Descriptions

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

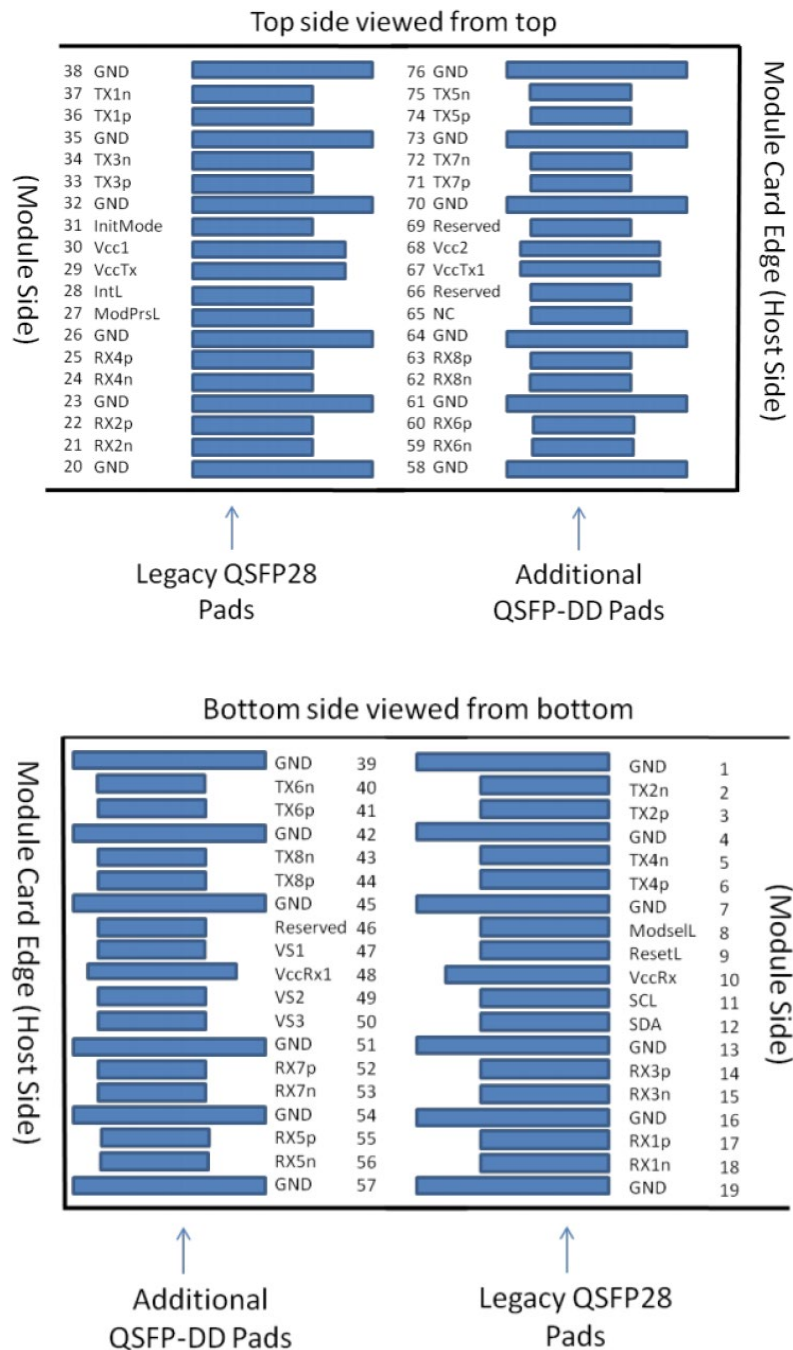
40	Tx6-	Transmitter Inverted Data Input.	
41	Tx6+	Transmitter Non-Inverted Data output.	
42	GND	Module Ground.	1
43	Tx8-	Transmitter Inverted Data Input.	
44	Tx8+	Transmitter Non-Inverted Data Output.	
45	GND	Module Ground.	1
46	Reserved	For Future Use.	3
47	VS1	Module Vendor-Specific 1.	3
48	VccRx1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

Notes:

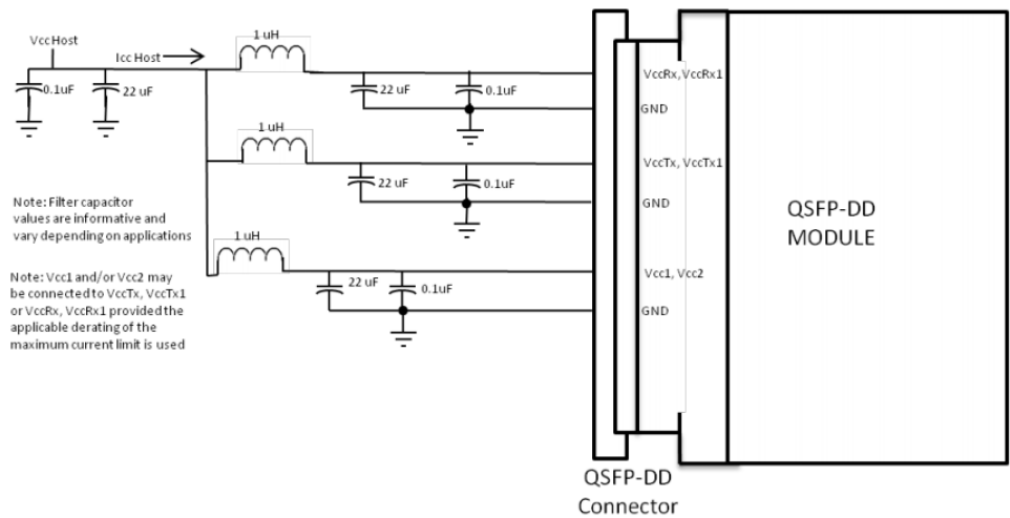
1. QSFP-DD uses common ground (GND) for all signals and supply (power). All are common within the QSFP-DD module, and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal common ground plane.

2. VccRx, VccRx1, Vcc1, Vcc2, VccTx, and VccTx1 shall be applied concurrently. VccRx, VccRx1, Vcc1, Vcc2, VccTx, and VccTx1 may be internally connected within the module in any combination. The connector Vcc pins are each rated for a maximum current of 1000mA.
3. All Vendor-Specific, Reserved, and Not Connected pins may be terminated with 50Ω to ground on the host. Pad 65 (Not Connected) shall be left unconnected within the module. Vendor-Specific and Reserved pads shall have an impedance to the GND that is greater than 10kΩ and less than 100pF.

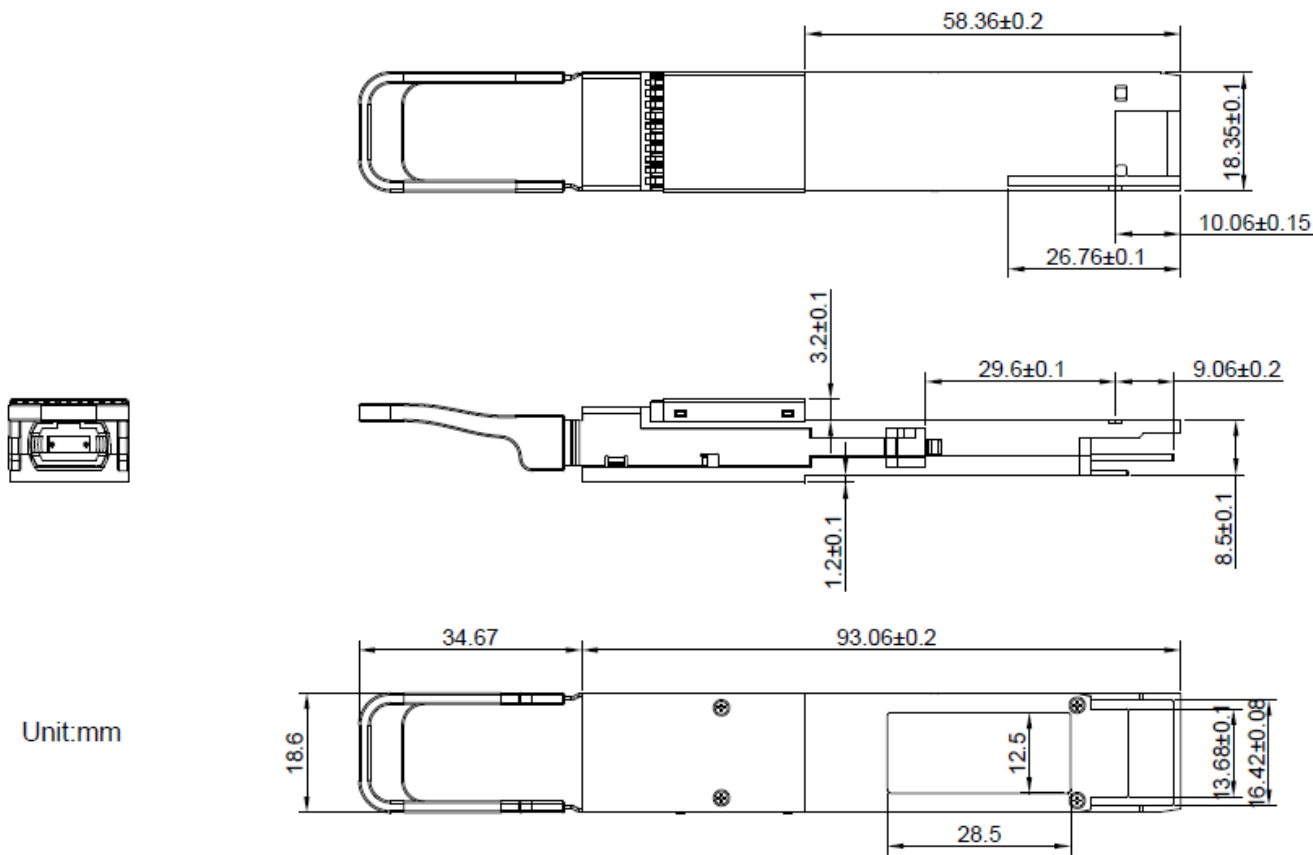
Electrical Pin-Out Details



Recommended Host Board Power Supply Filter Network



Mechanical Specifications



About ProLabs

Our experience comes as standard; for over 15 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with over 90 optical switching and transport platforms.

Complete Portfolio of Network Solutions

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 400G while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure that you get immediate answers to your questions and compatible product when needed. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.



Contact Information

ProLabs US

Email: sales@prolabs.com

Telephone: 952-852-0252

ProLabs UK

Email: salesupport@prolabs.com

Telephone: +44 1285 719 600