

QD400-QD400AOC-xM

400GBase QSFP-DD Active Optical Cable

0.5m to 50m Lengths, Commercial Temperature

FEATURES

- Hot-pluggable QSFP-DD form factor
- VCSEL transmitter and PIN PD receiver
- Support 425Gb/s aggregate bit rate
- Compliant with IEEE 802.3-2022 standard: 400GAUI-8 electrical interface
- Compliant with QSFP-DD MSA HW Rev 7.0 type 2A housing
- Compliant with CMIS Rev 5.0
- Support 0.5m~50m transmission with OM4 MMF
- Case operating temperature 0°C to 70°C
- Two wire serial Interface with digital diagnostic monitoring
- Complies with EU Directive 2011/65/EU (RoHS compliant)

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min.	Typical	Max.	Unit
Storage Temperature	TS	-40	-	85	°C
Supply Voltage	VCC	-0.5	-	3.6	V
Relative Humidity (non-condensing)	RH	5	-	95	%
Data Input Voltage Differential	IVDIP-VDINI	-	-	1	V
Control Input Voltage	VI	-0.3	-	VCC+0.5	V
Control Output Current	IO	-20	-	20	mA

RECOMMENDED OPERATING ENVIRONMENT

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Operating Case Temperature	TOPR	0	-	70	°C	
Power Supply Voltage	VCC	3.135	3.3	3.465	V	
Instantaneous peak current at hot plug	ICC_IP	-	-	3600	mA	
Sustained peak current at hot plug	ICC_SP	-	-	2970	mA	
Maximum Power Dissipation	PD	-	-	9	W	
Maximum Power Dissipation, Low Power Mode	PDLP	-	-	1.5	W	
Signalling speed	DRL	-	425	-	Gbd	PAM4
Two Wire Serial Interface Clock Rate	-	-	-	400	kHz	
Module power supply noise tolerance 10 Hz -10 MHz (ptp)	-	-	-	66	mVpp	
Rx Differential Data Output Load	-	-	100	-	Ohm	

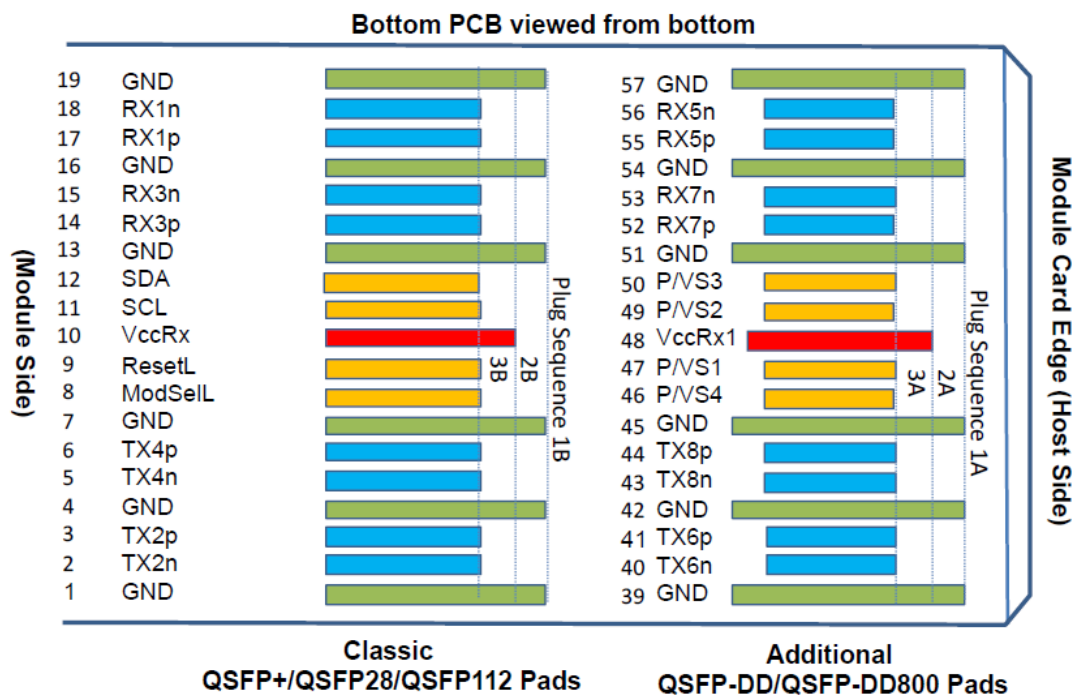
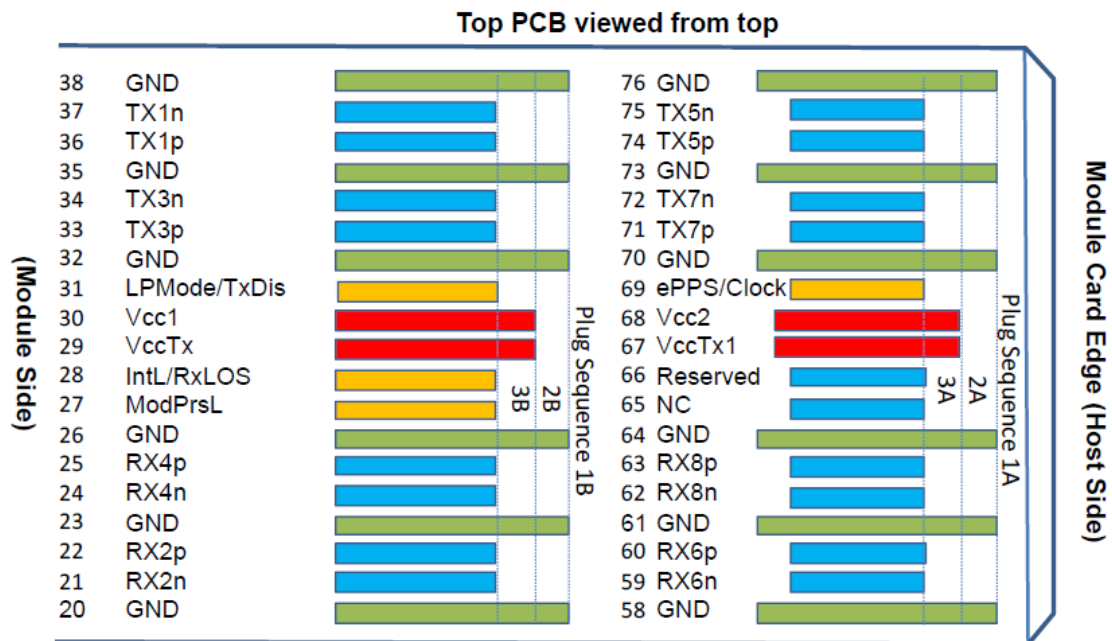
ELECTRICAL CHARACTERISTICS (High Speed Signal – Compliant with IEEE 802.3 400GAUI-8)

Parameter	Symbol	Min.	Typical	Max.	Unit
TRANSMITTER					
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					
AC common-mode output Voltage (RMS)		-	-	17.5	mV
Differential output Voltage		-	-	900	mV
Near-end Eye height, differential		70	-	-	mV
Far-end Eye height, differential		30	-	-	mV
Far end pre-cursor ISI ratio		-4.5	-	2.5	%
Differential Termination Mismatch		-	-	10	%
Transition Time (min, 20% to 80%)		9.5	-	-	ps
DC common mode Voltage		-350	-	2850	mV

ELECTRICAL CHARACTERISTICS (Low Speed Signal)

Parameter	Symbol	Min.	Max.	Unit
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

PIN ASSIGNMENT



Pin	Logic	Symbol	Definition	Pin	Logic	Symbol	Definition
1		GND	Ground	39		GND	Ground
2	CML-I	Tx2n	Transmitter Inverted Data Input	40	CML-I	Tx6n	Transmitter Inverted Data Input
3	CML-I	Tx2p	Transmitter Non-inverted Data Input	41	CML-I	Tx6p	Transmitter Non-inverted Data Input
4		GND	Ground	42		GND	Ground
5	CML-I	Tx4n	Transmitter Inverted Data Input	43	CML-I	Tx8n	Transmitter Inverted Data Input
6	CML-I	Tx4p	Transmitter Non-inverted Data Input	44	CML-I	Tx8p	Transmitter Non-inverted Data Input
7		GND	Ground	45		GND	Ground
8	LVTTL-I	ModSelL	Module Select	46	LVCMO S/CML-I LVCMO	P/VS4	Programmable/Module Vendor Specific 4
9	LVTTL-I	ResetL	Module Reset	47	S /CML-I	P/VS1	Programmable/Module Vendor Specific 1
10		VccRx	+3.3V Power Supply Receiver	48		VccRx1	3.3V Power Supply
11	LVC MOS-I/O	SCL	TWI serial interface clock	49	LVC MO S/CML-O	P/VS2	Programmable/Module Vendor Specific 2
12	LVC MOS-I/O	SDA	TWI serial interface data	50	LVC MO S/CML-O	P/VS3	Programmable/Module Vendor Specific 3
13		GND	Ground	51		GND	Ground
14	CML-O	Rx3p	Receiver Non-inverted Data Output	52	CML-O	Rx7p	Receiver Non-inverted Data Output
15	CML-O	Rx3n	Receiver Inverted Data Output	53	CML-O	Rx7n	Receiver Inverted Data Output
16		GND	Ground	54		GND	Ground
17	CML-O	Rx1p	Receiver Non-inverted Data Output	55	CML-O	Rx5p	Receiver Non-inverted Data Output
18	CML-O	Rx1n	Receiver Inverted Data Output	56	CML-O	Rx5n	Receiver Inverted Data Output
19		GND	Ground	57		GND	Ground
20		GND	Ground	58		GND	Ground
21	CML-O	Rx2n	Receiver Inverted Data Output	59	CML-O	Rx6n	Receiver Inverted Data Output
22	CML-O	Rx2p	Receiver Non-inverted Data Output	60	CML-O	Rx6p	Receiver Non-inverted Data Output
23		GND	Ground	61		GND	Ground
24	CML-O	Rx4n	Receiver Inverted Data Output	62	CML-O	Rx8n	Receiver Inverted Data Output
25	CML-O	Rx4p	Receiver Non-inverted Data Output	63	CML-O	Rx8p	Receiver Non-inverted Data Output
26		GND	Ground	64		GND	Ground
27	LVTTL-O	ModPrsL	Module Present	65		NC	Not connected
28	LVTTL-O	IntL/ RxLOS	Interrupt/optional RxLOS	66		Reserved	

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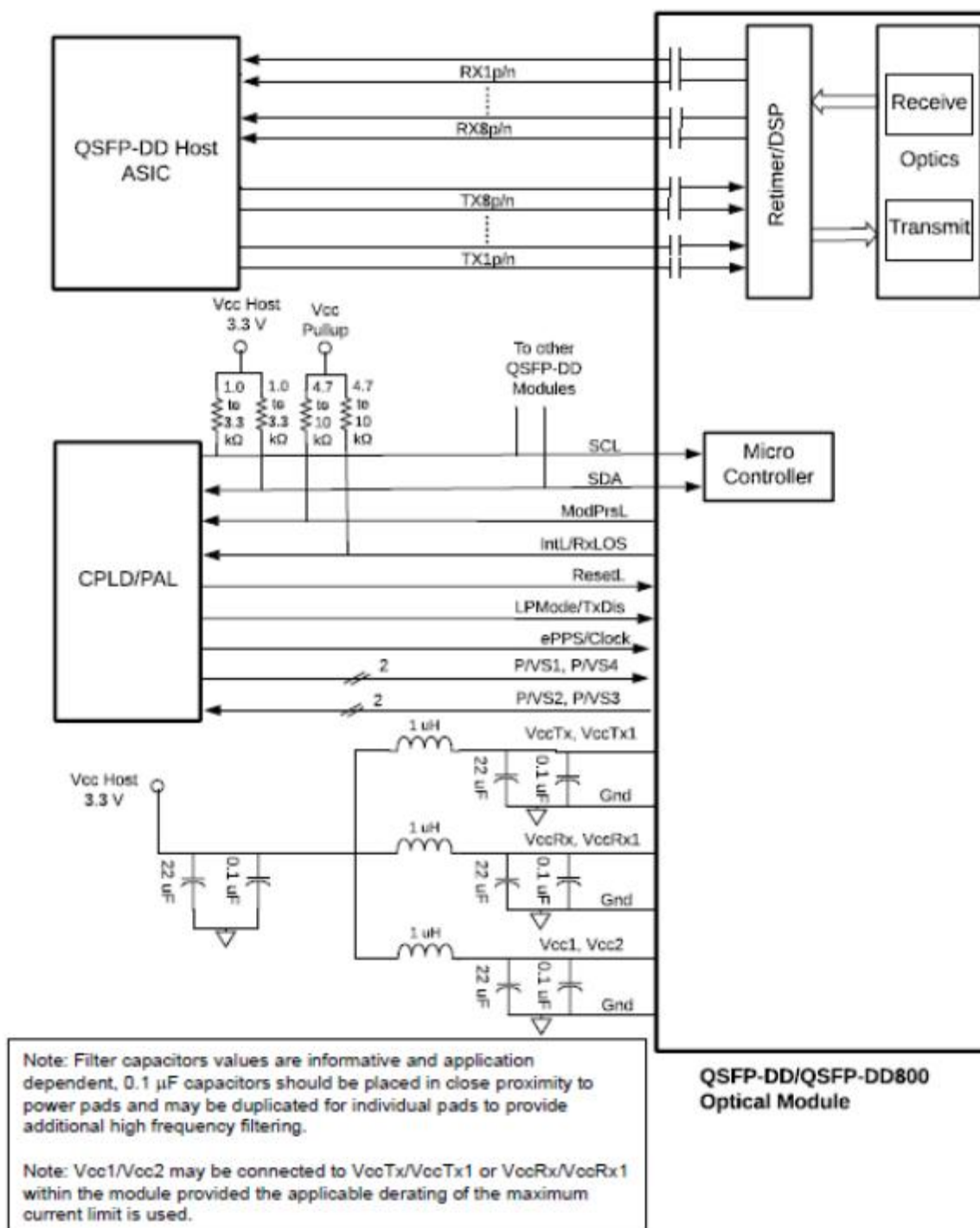
29		VccTx	+3.3V Power Supply Transmitter	67		VccTx1	3.3V Power Supply
30		Vcc1	+3.3V Power Supply	68		Vcc2	3.3V Power Supply
31	LVTTL-I	LPMode/TxDis	Low Power mode/optional TX Disable	69	LVC MOS-I	ePPS/Clock	1PPS PTP clock or reference clock input
32		GND	Ground	70		GND	Ground
33	CML-I	Tx3p	Transmitter Non-inverted Data Input	71	CML-I	Tx7p	Transmitter Non-inverted Data Input
34	CML-I	Tx3n	Transmitter Inverted Data Input	72	CML-I	Tx7n	Transmitter Inverted Data Input
35		GND	Ground	73		GND	Ground
36	CML-I	Tx1p	Transmitter Non-inverted Data Input	74	CML-I	Tx5p	Transmitter Non-inverted Data Input
37	CML-I	Tx1n	Transmitter Inverted Data Input	75	CML-I	Tx5n	Transmitter Inverted Data Input
38		GND	Ground	76		GND	Ground

Pin Definitions

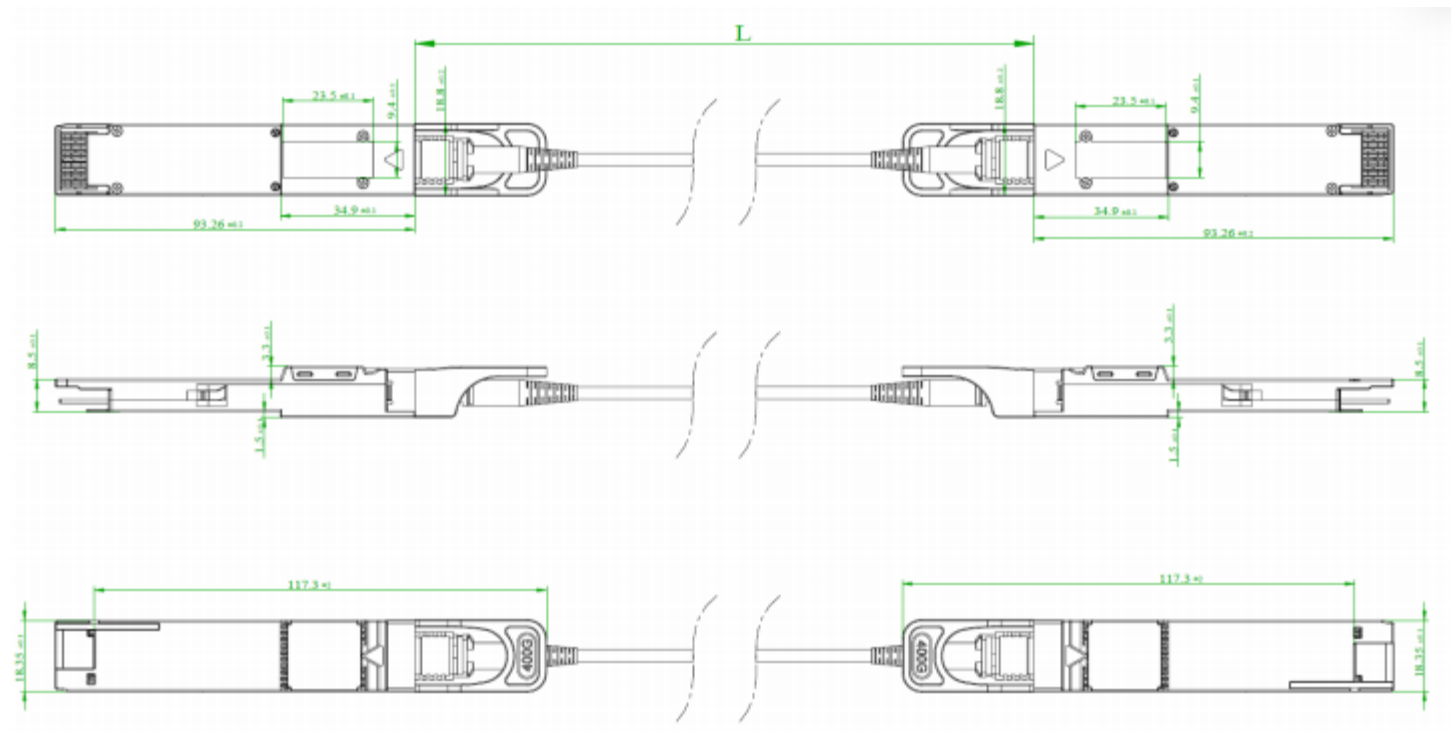
DIGITAL DIAGNOSTIC MONITOR

Parameter	Range	Accuracy	Unit	Calibration
Temperature	0 to 70	±3	°C	Internal
Voltage	3.135 to 3.465	±3%	V	Internal

RECOMMENDED HOST BOARD



MECHANICAL DIMENSIONS (UNITS: mm)



WARNINGS

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety: Class 1 Laser Product. Complies with FDA performance standards for laser products except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.

Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.