

QDD-LR8-400G

400GBASE-LR8 QSFP-DD | 1310 nm | 10 km | duplex LC

1. Product overview

400GBASE-LR8 QSFP-DD optical transceiver with eight wavelength lanes, duplex LC connector and two-wire digital diagnostic monitoring. Operating distance is 2 m to 10 km.

2. Key features

IEEE 802.3bs: 400GBASE-LR8 optical / 400GAUI-8 electrical; QSFP-DD MSA HW Rev 3.0; operating case 0 to 70°C; Class 1 laser; power consumption TBD in source.

3. Applications

400GBASE-LR8 400G Ethernet; Data Center.

4. Technical data

Parameter	Specification	Parameter	Specification
Storage temperature / humidity	-40 to +85°C / 5-95%, non-condensing	Absolute differential data input	1 V max
Absolute supply voltage	-0.5 to 3.6 V	Absolute control input / output current	-0.3 to Vcc+0.5 V / -20 to +20 mA

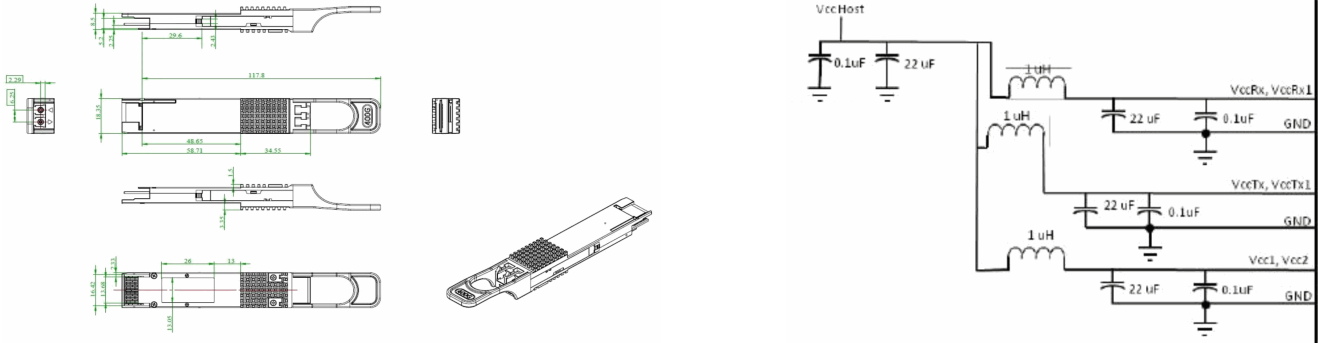
Electrical characteristics

Parameter	Specification	Parameter	Specification
TX differential p-p tolerance	900 mV min	RX AC common-mode RMS / differential output	17.5 mV max / 900 mV max
TX termination mismatch	10% max	RX near / far differential eye height	70 / 30 UI min
TX single-ended voltage tolerance	-0.4 to 3.3 V	RX far pre-cursor / termination mismatch	2.5% max / 10% max
TX / RX DC common-mode voltage	-350 to +2850 mV	RX transition time (20-80%)	9.5 ps min

Low-speed electrical limits

Parameter	Specification	Parameter	Specification
SCL/SDA output VOL	0-0.4 V	IntL VOL / VOH	0-0.4 / Vcc-0.5 to Vcc+0.3 V
SCL/SDA input VIL / VIH	-0.3 to 0.3Vcc / 0.7Vcc to Vcc+0.5 V	SCL/SDA output VOH	Vcc-0.5 to Vcc+0.3 V
InitMode/ResetL/ModSelL VIL / VIH	-0.3 to 0.8 / 2 to Vcc+0.3 V		

Source mechanical drawing and recommended host supply filter



5. Recommended operating conditions

Parameter	Specification	Parameter	Specification
Case temperature / supply	0 to 70°C / 3.135 / 3.3 / 3.465 V (min/typ/max)	Instantaneous / sustained hot-plug current	TBD / TBD mA max
Signaling rate per lane / RX load	26.5625 GBd typ / 100 ohm typ	Power / low-power mode	TBD / TBD W max
Control input high / low	0.7Vcc to Vcc+0.3 V / -0.3 to 0.3Vcc V	Supply noise / operating distance	50 mVpp max / 2-10000 m
2-wire serial interface clock	400 kHz max		

Simplified functional illustration



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6. Optical characteristics

TX and RX lane	Min / typical / max (nm)	TX and RX lane	Min / typical / max (nm)
L0	1272.55 / 1273.55 / 1274.54	L4	1294.53 / 1295.56 / 1296.59
L1	1276.89 / 1277.89 / 1278.89	L5	1299.02 / 1300.06 / 1301.09
L2	1281.25 / 1282.26 / 1283.27	L6	1303.54 / 1304.59 / 1305.63
L3	1285.65 / 1286.67 / 1287.68	L7	1308.09 / 1309.14 / 1310.19

Transmitter (per lane where stated)	Specification	Receiver / stressed test	Specification
SMSR	30 dB min	Damage threshold, each lane	6.3 dBm min
Total average launch power	13.2 dBm max	Average receive power, each lane	-9.1 to +5.3 dBm
Average launch power, each lane	-2.8 to +5.3 dBm [1]	Receive OMAouter, each lane	5.7 dBm max
OMAouter, each lane	0.2 to 5.7 dBm	OMAouter difference, any two lanes	4.5 dB max
OMAouter difference, any two lanes	4 dB max	Receiver reflectance	-26 dB max
OMAouter minus TDECQ; ER >4.5 dB	-1.2 dBm min	Sensitivity (OMAouter), each lane	-7.1 dBm max [3]
OMAouter minus TDECQ; ER <4.5 dB	-1 dBm min	Stressed sensitivity (OMAouter)	-4.7 dBm max [4]
TDECQ, each lane	2.3 dB max		
Average launch power, OFF / lane	-30 dBm max		
Extinction ratio	3.5 dB min		
RIN15.1OMA	-132 dB/Hz max		
Optical return loss tolerance	15.1 dB max		
Transmitter reflectance	-26 dB max [2]		

[1] Minimum average launch power is informative, not the principal signal-strength indicator. [2] Reflectance looking into transmitter. [3] Sensitivity is informative for transmitter SECQ 0.9 dB. [4] Conformance test at TP3, BER 2.4x10⁻⁴.

7. Digital diagnostics and management

Function	Source specification
Digital diagnostics (internal calibration)	Temperature 0-70°C, accuracy ±3°C; voltage 0-Vcc, accuracy 0.1 V; lane bias 0-100 mA, accuracy 10%; TX power -3.5 to +5.3 dBm, RX power -9.1 to +5.3 dBm, accuracy ±3 dB.
Soft control / status timing	MgmtInit 2000 ms max; ResetL assert 10 µs min; IntL assert/deassert 200/500 ms max; RX LOS assert 100 ms max; TX fault/flag assert 200 ms max; mask assert/deassert 100 ms max. Application/rate select change unsupported (N/A).
Squelch / disable timing (maximum)	RX squelch assert/deassert 15/15 ms; TX squelch assert/deassert 400/400 ms (not implemented by default); TX disable assert/deassert 100/400 ms; RX output disable assert/deassert 100/100 ms; squelch disable assert/deassert 100/100 ms.

Pin assignment / interface notes: TX p/n lanes 1-8: 36/37, 3/2, 33/34, 6/5, 74/75, 41/40, 71/72, 44/43 (CML-I; p non-inverted/n inverted; direction exceptions in notes). RX p/n lanes 1-8: 17/18, 22/21, 14/15, 25/24, 55/56, 60/59, 52/53, 63/62 (CML-O). GND: 1,4,7,13,16,19,20,23,26,32,35,38,39,42,45,51,54,57,58,61,64,70,73,76. 3.3 V: VccRx10, VccTx29, Vcc1 30, VccRx1 48, VccTx1 67, Vcc2 68. Controls: ModSelL8, ResetL9, SCL11, SDA12, ModPrsL27, IntL28, InitMode31. Reserved46/66/69; VS1/2/3=47/49/50; NC65. Host SDA/SCL pull-ups 4.7-10 kohm; other control pull-ups 1-3.3 kohm. Filter: 1 µH, 22 µF, 0.1 µF; 0.1 µF near power pins, may duplicate; Vcc1/2 may join VccTx/VccRx if current limit respected.

8. Safety and regulatory

Class 1 laser; EU Directive 2011/65/EU (RoHS). Use a static-free environment and ESD procedures; avoid direct and indirect eye exposure to laser radiation.

9. Ordering information

Product / file identifier	Description
QDD-LR8-400G	QSFP-DD 400G-LR8 8x50Gbps 10km, 1310nm 6dB SM LC

10. General notes

Source discrepancies retained: RX near/far eye height units are UI; IntL deassert is 500 ms. Digital TX monitoring range starts at -3.5 dBm, while TX average launch power starts at -2.8 dBm. Power and hot-plug currents are TBD. TX directions in the source table call pins 41,44,71,74 non-inverted outputs; other TX pins are inputs. Source OMA-minus-TDECQ conditions omit ER exactly 4.5 dB.