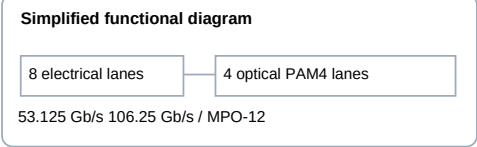


QSFPDD-DR4-400G

QSFP-DD, 400GbE-DR4, 4x100GbE, 500m
1310nm, 3dB, SM, MPO-8/12

1. Product overview

QSFPDD-DR4-400G is designed for 400 Gb/s network applications over up to 500 m of single-mode fiber. Four PAM4 optical lanes each operate at 106.25 Gb/s, providing an aggregate optical data rate of 425 Gb/s. The source describes four 1310 nm lanes and compliance with QSFP-DD MSA and 400GBASE-DR4 optical specifications.



2. Key features

- IEEE Std 802.3bs; 400G-DR4 optical specifications; QSFP-DD MSA
- CMIS4.0 management interface; parallel MPO-12 receptacle
- 4x106.25 Gb/s PAM4 optical lanes; 8x53.125 Gb/s PAM4 electrical interface
- Single 3.3 V supply; power consumption <8 W; commercial case temperature 0°C to +70°C
- RoHS compliant

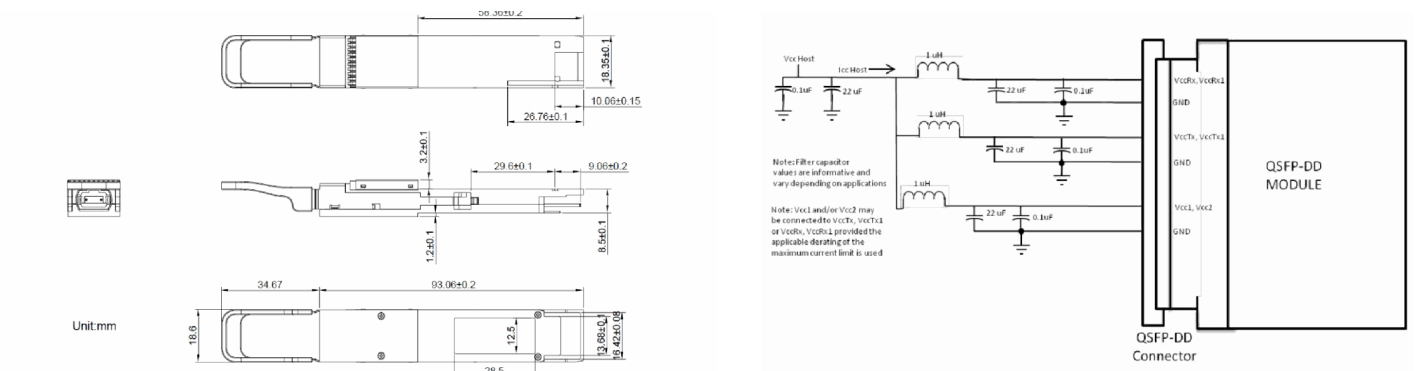
3. Applications

- 400G BASE-DR4 Ethernet
- Data Center

4. Technical data

Parameter	Specification	Parameter	Specification
Form factor / reach	QSFP-DD / up to 500 m SMF	Optical interface	MPO-12; MPO-8/12
Network / aggregate rate	400 Gb/s / 425 Gb/s optical	Optical lanes	4x106.25 Gb/s PAM4
Electrical interface	8x53.125 Gb/s PAM4	Wavelength / budget	1310 nm / 3 dB
Module supply current	2.55 A max	Power dissipation	8.0 W max
TX differential impedance	100 ohm typ	RX differential impedance	100 ohm typ
Differential input swing	180-900 mV p-p	Differential output swing	300-850 mV p-p
RX transition time (20%-80%)	9.5 ps min	Storage temperature	-40 to +85°C
Absolute supply voltage	-0.5 to 3.6 V	Relative humidity	15-85%

Source mechanical drawing (mm) and recommended host supply filter



5. Recommended operating conditions

Parameter	Specification	Parameter	Specification
Operating case temperature	0 to +70°C	Supply voltage (min/typ/max)	3.13 / 3.30 / 3.47 V
Data rate per channel	53.125 ±100 ppm GBd	Modulation format	PAM4

QSFPDD-DR4-400G

6. Optical characteristics

Transmitter	Specification	Receiver	Specification
Lane wavelengths (min/typ/max)	1304.5 / 1311 / 1317.5 nm	Lane wavelengths (min/typ/max)	1304.5 / 1311 / 1317.5 nm
Side-mode suppression ratio (SMSR)	30 dB min	Sensitivity each lane (OMAouter)	-4.4 dBm max [1]
Average launch power, each lane	-2.9 to +4 dBm	Average receive power (Pavg)	-5.9 to +4 dBm
Outer optical modulation amplitude	-0.8 to +4.2 dBm (OMAouter)	Receive power each lane (OMAouter)	4.2 dBm max
OMA minus TDECQ	-2.2 dBm min	Optical reflectance	-26 dB max
Transmitter and dispersion penalty eye	3.4 dB max (TDECQ)	LOS De-Assert	-10 dBm max
Extinction ratio	3.5 dB min	LOS Assert	-16 dBm min
Average launch power of OFF	-15 dBm max	LOS hysteresis	0.5 dB min
Optical return loss tolerance	21.4 dB max		
Transmitter reflectance	-26 dB max		

[1] Receiver sensitivity measured with PRBS31Q test pattern, 53.125 GBd, PAM4 and BER <2.4E-4.

7. Digital diagnostics and management

Parameter	Specification / source pin assignment
Management	CMIS4.0; 2-wire serial interface: SCL pin 11, SDA pin 12. Digital diagnostic monitor values and accuracy limits are not specified in the source.
Module controls	ModSelL 8 (select); ResetL 9 (reset); ModPrsL 27 (present); IntL 28 (interrupt); Init Mode 31 (initialization).
TX pins, p/n by lane 1-8	36/37; 3/2; 33/34; 6/5; 74/75; 41/40; 71/72; 44/43. Source direction labels are retained in General notes.
RX pins, p/n by lane 1-8	17/18; 22/21; 14/15; 25/24; 55/56; 60/59; 52/53; 63/62. All are receiver non-inverted / inverted data outputs.
Power pins, 3.3 V	VccRx 10; VccTx 29; Vcc1 30; VccRx1 48; VccTx1 67; Vcc2 68. Apply concurrently; any combination may be internally connected. Each Vcc contact: 1000 mA maximum.
Ground pins	1,4,7,13,16,19,20,23,26,32,35,38,39,42,45,51,54,57,58,61,64,70,73,76. All signal/supply grounds are common; module voltages refer to GND. Connect directly to the host signal ground plane.
Vendor / reserved / no connect	VS1 47; VS2 49; VS3 50; Reserved 46,66,69; NC 65. All may be terminated with 50 ohm to host ground. Pad 65 is internally unconnected. Vendor/reserved pads: impedance to GND >10 kohm and <100 pF.

8. Safety and regulatory

RoHS compliant. Source specifies IEEE Std 802.3bs, 400G-DR4 optical specifications and QSFP-DD MSA compliance. No laser class or ESD threshold is stated. Absolute maximum ratings are stress limits only; operation at these limits is not implied. Exceeding them can cause permanent damage, and prolonged exposure can reduce reliability.

9. Ordering information

Ordering number	Product description
QDD-400GDR4	QSFP-DD, 400GbE-DR4, 4x100GbE, 500m 1310nm, 3dB, SM, MPO-8/12