

Q400G-112-DR4

400G QSFP112 DR4 | 1310 nm | 500 m; host FEC required

1. Product overview

Hot-pluggable 400G QSFP112 optical module for single-mode fiber (SMF). Four PAM4 lanes support 106.25 Gb/s per channel. 4 parallel optical lanes; 4 x 106.25 Gb/s PAM4 electrical interface (400GAUI-4). Optical connectivity uses MTP/MPO-12 APC.

2. Key features

- 4-channel PAM4 architecture; MTP/MPO-12 APC optical interface
- Maximum power consumption 10 W; single +3.3 V supply
- Digital diagnostic monitoring; operating case temperature 0 to +70°C
- Reach: 2-500 m; host FEC required

3. Applications

400G Ethernet; data center interconnect; InfiniBand interconnect; enterprise networking.



4. Technical data

Parameter	Specification
Form factor / aggregate rate	QSFP112 / 400G
Fiber / optical connector	single-mode fiber (SMF) / MTP/MPO-12 APC
Power consumption	10 W max
Absolute maximum ratings	Storage -40 to +85°C; humidity 10-90% non-condensing; supply 0 to +4 V.

Electrical characteristics (limits and units follow the source)

Parameter	Specification	Parameter	Specification
TX / RX signaling rate	53.125 GBd typ per lane	RX differential output p-p	900 mV max
TX differential p-p input tolerance	900 mV min	RX near/far-end eye height	24 mV min
TX single-ended tolerance	-0.4 to +3.3 V	RX near/far-end vertical eye closure	7.5 dB max
TX / RX DC common-mode voltage	-350 to +2850 mV	RX near/far-end ESMW	TBD UI
TX / RX termination mismatch	10% max	RX far-end pre-cursor ISI ratio	TBD %
TX common-to-differential return loss	802.3ck Equation 120G-1	RX common-to-differential return loss	802.3ck 120G-1; dB
TX effective return loss / stressed input	TBD / see 120G.3.4.1	RX effective return loss	TBD dB
RX AC common-mode output, RMS	17.5 mV max	RX transition time (20%-80%)	TBD ps

Mechanical data: QSFP112 Type 2 (87.4 mm). Drawing callouts (mm): 121.77 ±2; 87.40 ±0.50; 18.35 ±0.10; 18.35 ±0.30; 12.87 ±0.30; 12.20 ±0.10; 8.50 ±0.10; 4 ±0.10; 2.30 ±0.10; 1.45 ±0.10. Pull tab: blue, Pantone 300U.

5. Recommended operating conditions

Parameter	Specification
Case temperature	0 to +70°C
Supply voltage (min / typ / max)	3.13 to 3.46 V; nominal +3.3 V
Transmission distance	2-500 m; host FEC required
Pre-FEC / post-FEC BER	2.4 x 10 ⁻⁴ max / 1 x 10 ⁻¹² max

Apply VccRx, VccTx and Vcc1 concurrently. All GND pins are common and connect directly to the host ground plane. Connector rating: 1.5 A per pin; source note specifies 2.0 A for high module power of 15-20 W.

Q400G-112-DR4

6. Optical characteristics

Transmitter / common	Specification	Receiver / test conditions	Specification
TX / RX rate, each lane	53.125 GBd typ; PAM4	Damage threshold	5 dBm min
TX / RX wavelength, min/typ/max	1304.5 / 1310 / 1317.5 nm	Average receive power / lane	-5.9 to +4 dBm
Average launch power / lane	-2.9 to +4 dBm	Receive OMA / lane	4.2 dBm max
OMAAouter / lane	-0.8 to +4.2 dBm	RX reflectance	-26 dB max
Average TX-off power / lane	-15 dBm max	Sensitivity OMAouter / lane	-3.9 dBm max; informative [1]
OMAAouter minus TDECQ / lane	-2.2 dB min	Stressed sensitivity / lane	-1.9 dBm max
TDECQ / lane	3.4 dB max	Stress-test SECQ / test lane	3.4 dB typ
Extinction ratio	3.5 dB min	Stress-test aggressor OMAouter	4.2 dBm typ
RIN21.4OMA	-136 dB/Hz max	RX LOS Assert	-15.0 dBm min (source column)
SMSR	30 dB min	RX LOS De-assert	-8.9 dBm max
Optical return loss tolerance	21.4 dB max (source column)	RX LOS hysteresis	1.5 dB typ
TX reflectance	-26 dB max		

7. Digital diagnostics and management

Function	Specification
Management / DDM	CMIS 5.0. Absolute monitor error: temperature ±3°C; supply ±3%; bias ±10%; RX power ±3.0 dB; TX power ±3.0 dB.
SCL/SDA output / input	VOL 0-0.4 V; VOH Vcc-0.5 to Vcc+0.3 V; VIL -0.3 to 0.3 x Vcc V; VIH 0.7 x Vcc to Vcc+0.5 V. IOL max 3.0 mA fast mode / 20 mA fast-mode plus.
I/O capacitance / bus load	14 pF max per SCL/SDA pin; bus 100 pF max with 3.0 kΩ pull-up or 200 pF max with 1.6 kΩ pull-up.
LPMode/TxDis, Reset, ModSelL	VIL -0.3 to 0.8 V; VIH 2 to Vcc+0.3 V; lin ≤125 μA for Vin <Vcc.
IntL/RxLOS / ModPrsL	IntL/RxLOS: VOL 0-0.4 V (IOL 2 mA); VOH Vcc-0.5 to Vcc+0.3 V (10 kΩ host pull-up). ModPrsL: VOL 0-0.4 % (source unit), IOL 2 mA; VOH no value, unit dB; may short to GND.

Pin assignment: TX p/n lanes 1-4: 36/37, 3/2, 33/34, 6/5; RX p/n lanes 1-4: 17/18, 22/21, 14/15, 25/24. GND: 1,4,7,13,16,19,20,23,26,32,35,38. VccRx/Tx/1: 10/29/30. Control: 8 ModSelL; 9 ResetL; 11 SCL; 12 SDA; 27 ModPrsL; 28 IntL/RxLOS; 31 LPMode/TxDis. Plug sequence: GND 1; supplies 2; other pins 3.

8. Safety and regulatory

QSFP112 MSA Rev. 2.0; IEEE Std 802.3ck; 400GBASE-DR4 optical specifications; CMIS 5.0; RoHS 2.0.

9. Ordering information

GLOBALfiber part number	Product description
Q400G-112-DR4	QSFP112 400G-DR4 4x100Gbps PAM4, 1310nm 3dB 500m SM MPO12/APC

10. General notes

[1] Sensitivity is informative for transmitter SECQ up to 3.4 dB. The source prints "RS=max (-3.9, -SECQ5.3)"; this ambiguous equation is retained without correction. Optical return loss tolerance is in the maximum column. ModPrsL VOL uses % as its source unit; its VOH unit is dB with no numeric value. TBD electrical values remain unspecified. Host FEC is required for the maximum link distance.