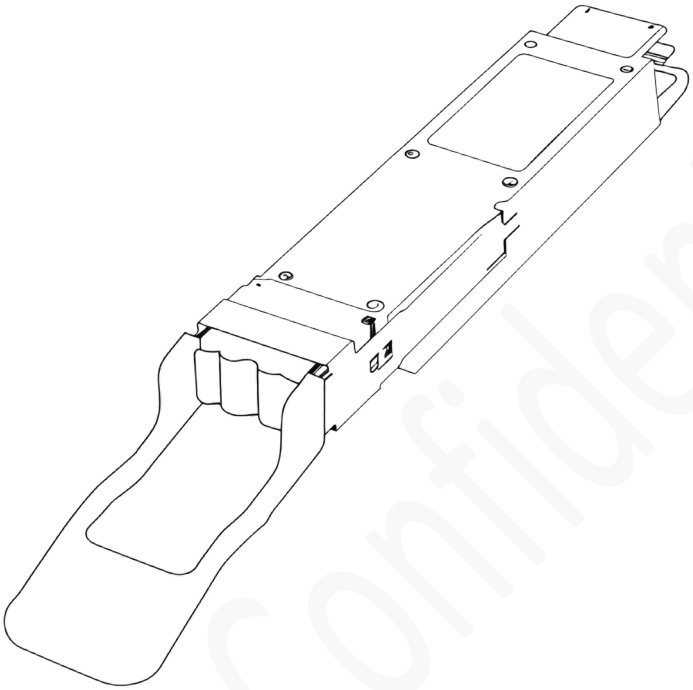
Product Datasheet

400G QSFP112 FR4 Transceiver



Application

- Data center & Networking Equipment
- Servers/Storage Devices
- High Performance Computing (HPC)
- Switches/Routers
- Telecom Central Offices (CO)
- Test and Measurement Equipment

1.0 Product Specification

1.1 Absolute Maximum Ratings (TC=25℃, unless otherwise noted)

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings will cause permanent damage and/or adversely affect device reliability.

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Storage Temperature	TS	-40	-	+85	℃	
Maximum Supply Voltage	Vcc	-0.5	-	3.6	V	
Operating Relative Humidity	RH	5	-	95	%	No condensation
Control Input Voltage	V_I	-0.3	-	V_{CC}+0.5	V	

1.2 General Specifications (Tc=25℃, unless otherwise noted)

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	T_{OPR}	0	-	70	℃	
Power Supply Voltage	V_{CC}	3.135	3.3	3.465	V	
Maximum Power Dissipation	P_D	-	7.5	8	W	
Signaling Rate per Lane	SRL	-	53.125	-	GBd	PAM4
Two Wire Serial Interface Clock Rate	-	-100	-	400	kHz	
Power Supply Noise Tolerance (10Hz - 10MHz)	-	-	-	66	mV	
Rx Differential Data Output Load	-	-	100	-	Ohm	
Operating Distance (SFM)	-	-	-	2000	m	

1.3 Transmitter Characteristics (TC=25℃, unless otherwise noted)

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Wavelength	λ_1	1264.5	1271	1277.5	nm	
	λ_2	1284.5	1291	1297.5	nm	
	λ_3	1304.5	1311	1317.5	nm	
	λ_4	1324.5	1331	1337.5	nm	
RMS spectral width	$\Delta\lambda_{rms}$			0.6	nm	
Average Launch Power, each lane	AOP_L	-4.6	-	4.0	dBm	1
Outer Optical Modulation Amplitude (OMA_{outer}), each lane	T_{OMA}	-2.6		3.5	dBm	2
Transmitter and Dispersion Eye Closure for PAM4 (TDECQ), each lane	TDECQ	-	-	3.4	dB	
Average Launch Power of OFF Transmitter, each lane	T_{OFF}	-	-	-30	dBm	
Extinction Ratio, each lane	ER	2.5	3.5	-	dB	
$RIN_{14}OMA$	RIN	-	-	-132	dB/Hz	
Optical Return Loss Tolerance	ORL		-	17.1	dB	
Transmitter Reflectance	T_R	-	-	-26	dB	3

Notes

1. Average launch power, each lane (min) is informative and not the principal indicator of signal strength.
2. Even if max (TECQ, TDECQ) < 1.8dB, OMAouter (min) must exceed this value.
3. Transmitter reflectance is defined looking into the transmitter.

1.4 Receiver Characteristics (TC=25℃, unless otherwise noted)

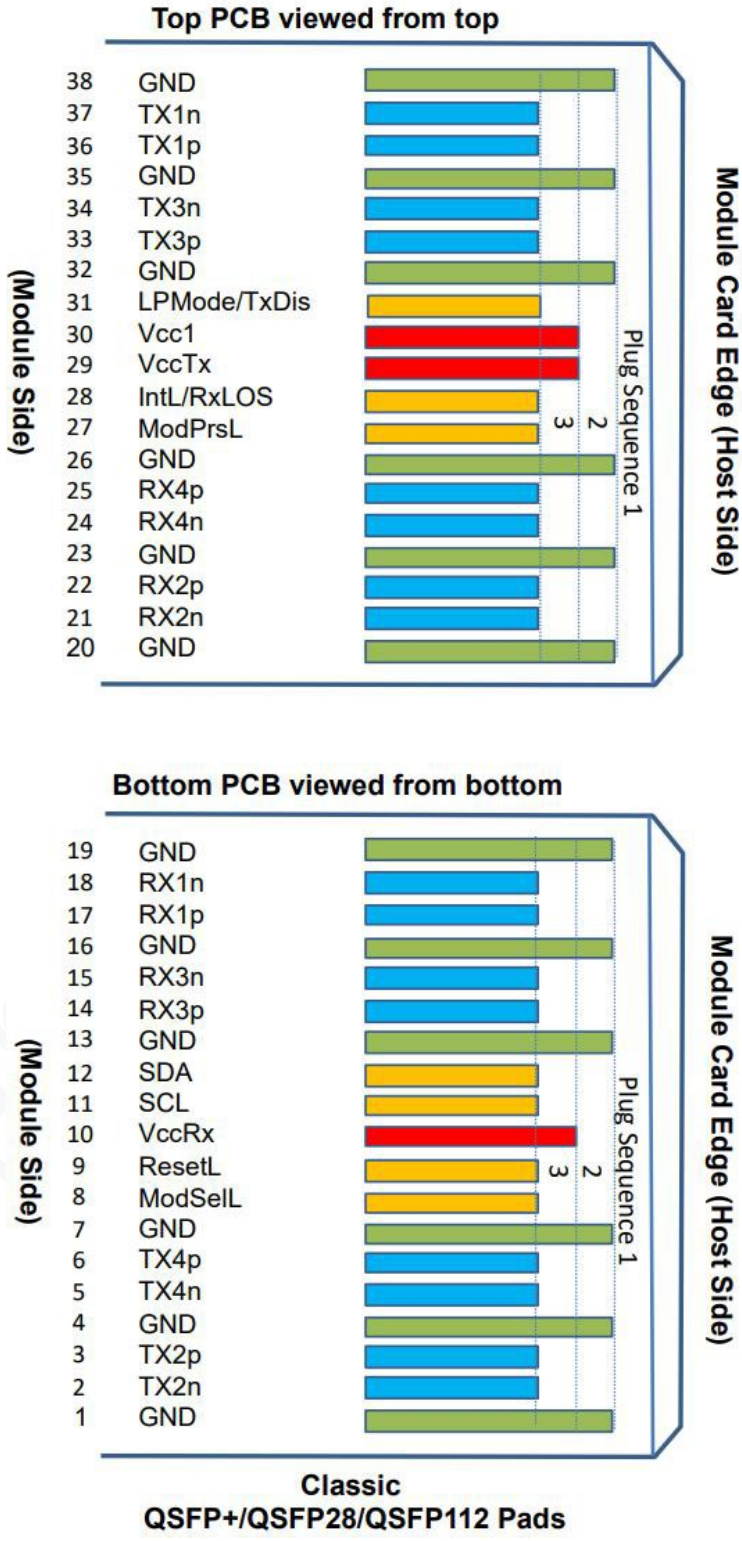
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Wavelength	λ_1	1264.5	1271	1277.5	nm	
	λ_2	1284.5	1291	1297.5	nm	
	λ_3	1304.5	1311	1317.5	nm	
	λ_4	1324.5	1331	1337.5	nm	
Damage Threshold, average optical power, each lane	AOP_D	5	-	-	dBm	
Average Receive Power, each lane	AOP_R	-6.3	-	4.0	dBm	
Receive Power (OMA_{outer}), each lane	OMA_R	-	-	3.5	dBm	
Receiver Reflectance	RR	-	-	-26	dB	
Receiver Sensitivity (OMA_{outer}), each lane	S_{OMA}	-	-	-4.4	dBm	1
Stressed Receiver Sensitivity (OMA_{outer}), each lane	SRS	-	-	-2.5	dBm	2

Conditions of stressed receiver sensitivity test						
Stressed eye closure for PAM4	SECQ		4.4		dB	
OMA_{outer} of each aggressor lane	OMA_{outer}		3.5		dBm	

Notes

1. Receiver sensitivity (OMAouter), each lane (max) is informative and is defined for a transmitter with TDECQ<=1.8 dB
2. Measured with conformance test signal at TP3 for the BER = 2.4x10-4

1.5 PIN Descriptions



Pad	Logic	Symbol	Description	Plug Sequence[4]	Notes
1		GND	Ground	1	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	3	
3	CML-I	Tx2p	Transmitter Non-Inverted Data Input	3	
4		GND	Ground	1	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	3	
6	CML-I	Tx4p	Transmitter Non-Inverted Data Input	3	
7		GND	Ground	1	1
8	LVTTL-I	ModSelL	Module Select	3	
9	LVTTL-I	ResetL	Module Reset	3	
10		VccRx	+3.3V Power Supply Receiver	2	2
11	LVCMOS-I/O	SCL	TWI serial interface clock	3	
12	LVCMOS-I/O	SDA	TWI serial interface data	3	
13		GND	Ground	1	1
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	3	
15	CML-O	Rx3n	Receiver Inverted Data Output	3	
16		GND	Ground	1	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	3	
18	CML-O	Rx1n	Receiver Inverted Data Output	3	
19		GND	Ground	1	1
20		GND	Ground	1	1
21	CML-O	Rx2n	Receiver Inverted Data Output	3	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	3	
23		GND	Ground	1	1
24	CML-O	Rx4n	Receiver Inverted Data Output	3	
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	3	
26		GND	Ground	1	1
27	LVTTL-O	ModPrsL	Module Present	3	
28	LVTTL-O	IntL/ RxLOS	Interrupt/optional RxLOS	3	
29		VccTx	+3.3V Power supply transmitter	2	2
30		Vcc1	+3.3V Power supply	2	2
31	LVTTL-I	LPMode/ TxDis	Low Power mode/optional TX Disable	3	
32		GND	Ground	1	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	3	
34	CML-I	Tx3n	Transmitter Inverted Data Input	3	
35		GND	Ground	1	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	3	
37	CML-I	Tx1n	Transmitter Inverted Data Input	3	
38		GND	Ground	1	1

Note 1: QSFP112 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. Each connector Gnd contact is rated for a maximum current of 500 mA.
Note 2: VccRx, Vcc1, and VccTx shall be applied concurrently. Supply requirements defined for the host side of the Host Card Edge Connector are listed in Table 13. For power classes 4 and above the module differential loading of input voltage pads must not result in exceeding contact current limits. Each connector Vcc contact is rated for a maximum current of 1500 mA.
Note 4: Plug Sequence specifies the mating sequence of the host connector and module. The sequence is 1, 2, and 3 see Figure 14 for pad locations.

2.0 Product Information

Data Rate	Factor		Optical	Wavelength	Reach
400G	QSFP112	FR4	LC	1310nm	2000m

ESD Safety Cautionsy

This transceiver is specified as ESD threshold 1KV for high speed data pins based on Human Body Model per ANSI/ESDA/JEDECJS-001. The units are subjected to 15kV air discharges during operation and 8kV direct contact discharges to the case. However, normal ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

Important Notice

The performance figures, data, and any illustrative material presented in this datasheet are typical and must be explicitly confirmed in writing by Quantex before they are deemed applicable to any specific order or contract.

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3.0 Revision Record

Rev.	Comments	Date
A01	Initial Release	2025/05/16