

400G QSFP112 SR4 Optical Transceiver

1.Product Specification

Features

- Silicon photonics integrated solution
- Hot-pluggable QSFP112 form factor
- Maximum link length of 50m on OM4 fiber with FEC
- +3.3V single power supply
- Power dissipation < 9W
- Operating case temp Commercial: 0°C to +70 °C
- MPO-12 APC connector
- RoHS compliant
- Pre-FEC BER $\leq 1E-8$ in the switcher equipment self-loopback test

Application

- 400GBASE-SR4 per IEEE 802.3db
- 400GAUI-4

Order Information

Table 1-Order Information

NA	Bit Rate (Gbps)	Laser (nm)	Distance ^{note1}	Fiber Type	DDMI	Connector	Temp ^{note2}
400G QSFP112	425.0	850	50m	MMF	YES	MPO 1x12 APC	0°C~+70°C

Note:

1.OM4 fiber, 30m for OM3 fiber, with FEC

2.Case Temperature

Absolute Maximum Ratings

Table2- Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Supply Voltage	Vcc3	-0.5	-	+3.6	V	
Storage Temperature	Ts	-40	-	+85	°C	
Operating Humidity	RH	+5	-	+85	%	1
Control Input Voltage	VI	-0.3	-	VCC+0.5	V	1

Note:1 No condensation

Recommended Operating Conditions

Table 3- Recommended operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	TC	0	-	+70	°C	
Power Supply Voltage	Vcc	3.135	3.3	3.465	V	
Power Dissipation	Pd	-	-	9	W	

Electrical Characteristics

Table 4- Electrical Characteristics

Parameter	Symbol	Unit	Min	Typ	Max	Notes
Transmitter						
Signaling Rate per Lane	SR	Gbd	53.125 ± 100 ppm			
Modulation format	-	-	PAM4			
Differential pk-pk input Voltage tolerance	V _{in,pp,diff}	mV	750	-	-	
Differential termination mismatch	-	%	-	-	10	
Single-ended voltage tolerance range	-	V	-0.4	-	3.3	
DC common mode voltage	-	mV	-350	-	2850	
Receiver						
Signaling Rate per Lane	SR	Gbd	53.125 ± 100 ppm			
Modulation format	-	-	PAM4			
Differential output Voltage (Long mode)	-	mV	-	-	845	
Differential output Voltage (Short mode)	-	mV	-	-	600	
Near-end Eye height, differential	-	mV	70	-	-	
Far-end Eye height, differential	-	mV	30	-	-	
Far end pre-cursor ratio	-	%	-4.5	-	2.5	
Differential Termination Mismatch	-	%	-	-	10	
Transition Time (min, 20% to 80%)	-	%	9.5	-	-	
DC common mode Voltage	-	mV	-350	-	2850	

Table 5-Optical Characteristics

Parameter	Symbol	Unit	Min	Typ	Max	Notes
Transmitter						
Center wavelength	CW	nm	844	850	863	
RMS Spectral Width	SW	dBm	-	-	0.6	
Average Launch Power per Lane	AOP	dBm	-4.6	-	4.0	1
Outer Optical Modulation Amplitude (OMA _{outer}), each lane (min)	TxOMA	dBm	-2.6	-	3.5	
Transmitter and Dispersion Eye Closure for PAM4 (TDECQ), each lane	TDECQ	dB	-	-	4.4	
Average Launch Power of OFF Transmitter, each lane	TOFF	dBm	-	-	-30	
Extinction Ratio, each lane	ER	dB	2.5	-	-	
Optical Return Loss Tolerance	ORL	dB	-	-	12	
Transmitter Reflectance	TR	dBm	-	-	-26	2
Receiver						
Wavelength	W	nm	842	-	865	
Damage Threshold, average optical power, each lane	DT	dBm	5	-	-	
Average Receive Power, each lane	RXP _x	dBm	-6.3	-	4	
Receive Power (OMA) per Lane	RxOMA	dBm	-	-	3.5	
Receiver Reflectance	R _{fl}	dB	-	-	-26	
Receiver Sensitivity (OMA _{outer}), each lane	SOMA	dBm	-4.4	-	-	3

Note:

1.Minimum value is informative only and not the principal indicator of signal strength.

2.Transmitter reflectance is defined looking into the transmitter.

3.Receiver sensitivity (OMA_{outer}), each lane (max) is informative and is defined for a transmitter with TDECQ≤1.8 dB

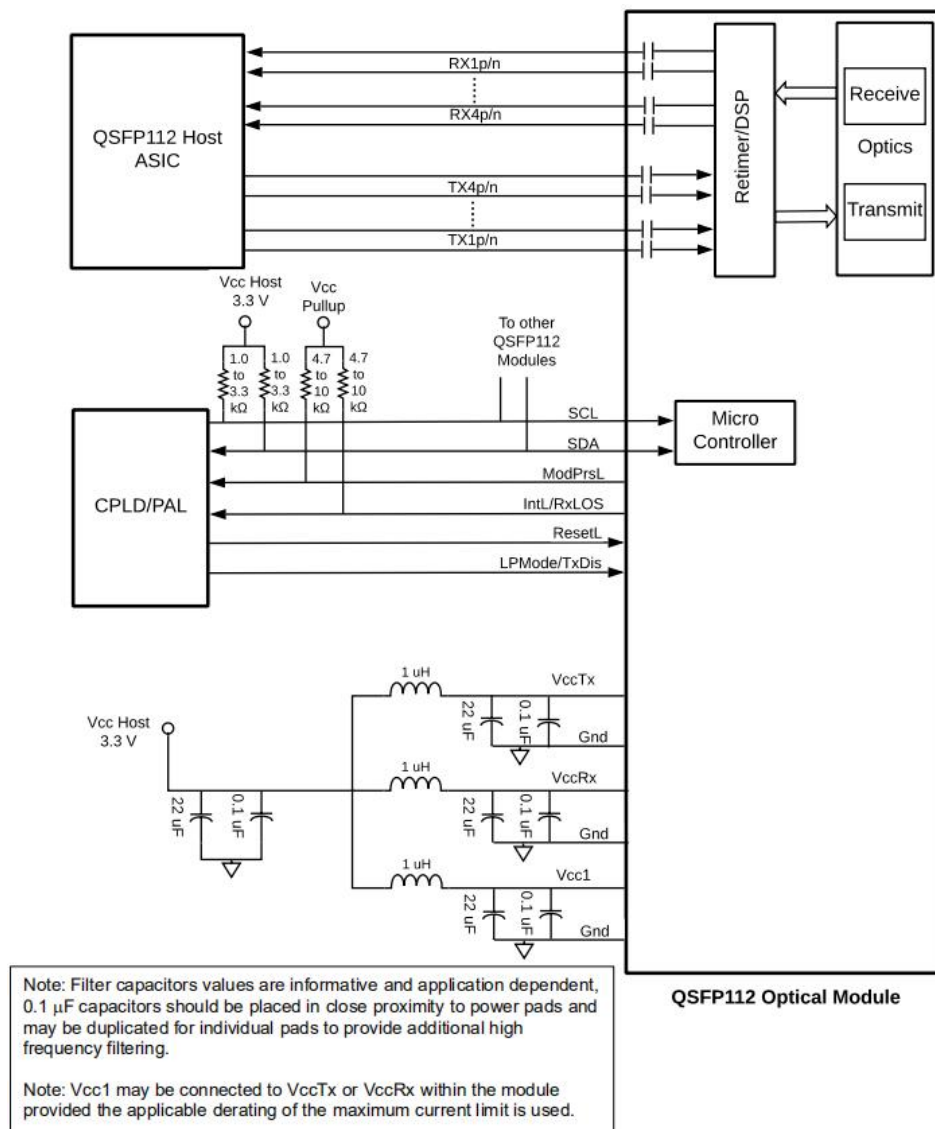


Figure 1, Recommended Interface Circuit

Pin arrangement

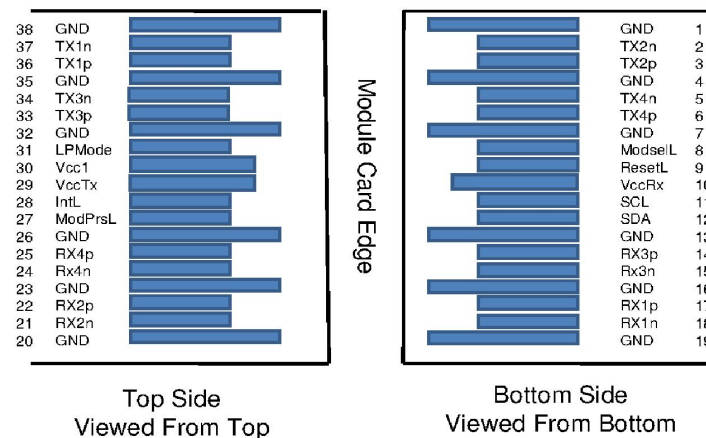


Figure 2, Pin View

Table 6-Pin Function Definitions

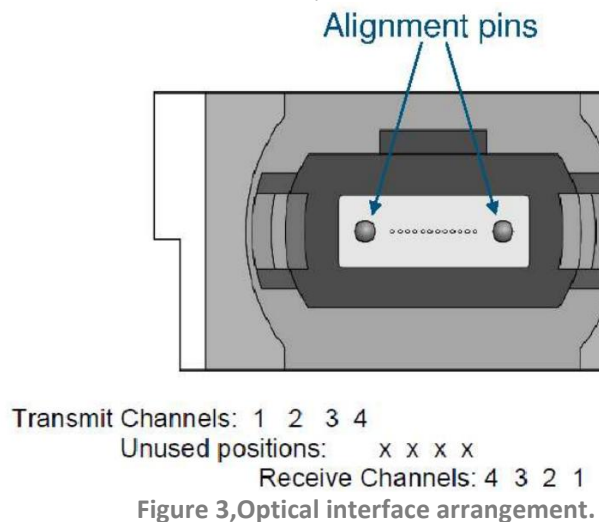
Pin	Symbol	Name/Description	Notes
1	GND	Ground	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	1
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	Vcc Rx	+3.3V Power Supply Receiver	
11	SCL	2-wire serial interface clock	
12	SDA	2-wire serial interface data	
13	GND	Ground	1
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	1
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Ground	1
20	GND	Ground	1
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	1
24	Rx4n	Receiver Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	1
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	Vcc Tx	+3.3V Power supply transmitter	
30	Vcc1	+3.3V Power supply	
31	LPMode	Low Power Mode	
32	GND	Ground	1
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	1
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	1

Note: 1. Circuit ground is internally isolated from chassis ground.

Compatible with CMIS rev 5.2.

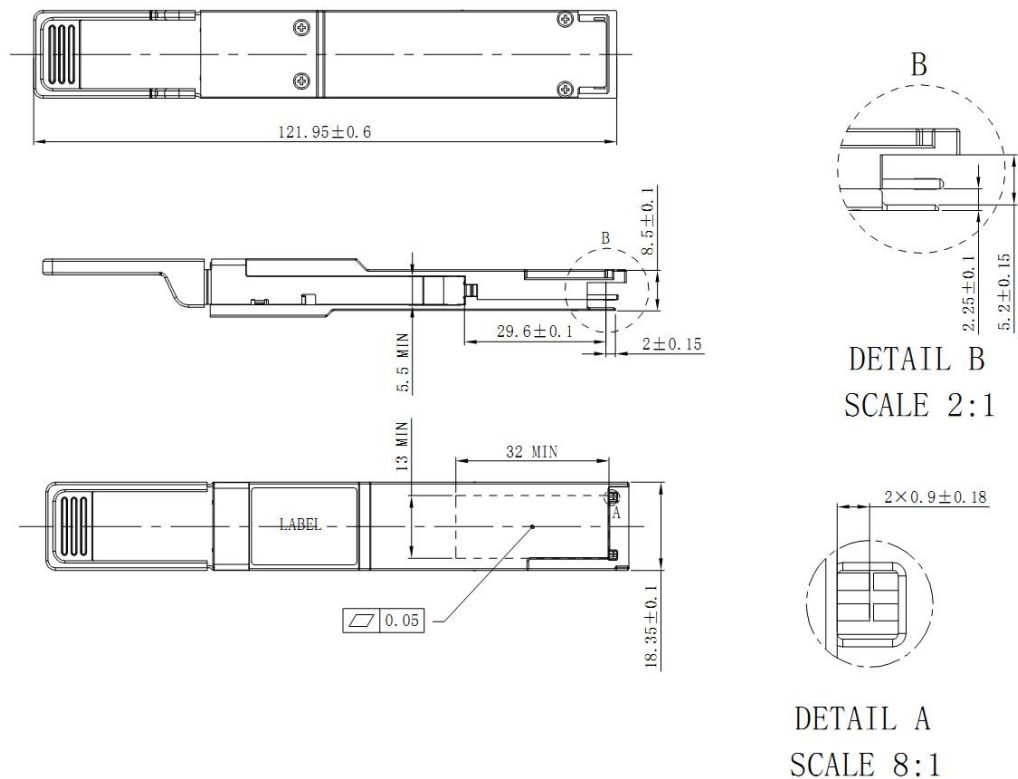
Optical interface arrangement

The optical port is a male MPO connector receptacle, with fiber lane assignments as shown in Figure 3



Mechanical

400G SR4 QSFP112 transceivers are compatible with QSFP112 MSA Specification Rev1.0 for pluggable form factor module.



Unit mm

Figure 5, Mechanical Diagram