400Gb/s QSFP112 VR4 50m Optical Transceiver

Features

- 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

Applications

- 400GBASE-VR4 per IEEE 802.3db
- 400GAUI-4

Absolute Maximum Ratings

Table1-Absolute Maximum Ratings

Parameter	Symbols	Min.	Max.	Unit	Notes
Storage Temperature	T_S	-40	85	℃	
Control Input Voltage	VI	-0.3	VCC+0.5	V	1
Power Supply Voltage	V_{CC3}	-0.5	3.6	V	
Relative Humidity (non-condensation)	RH	5	85	%	1

Note1：

[1] No condensation

Recommended Operating Conditions

Table2-Recommended Operating Conditions

Parameter	Symbols	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	Tc	0		+70	℃	
Power Supply Voltage	V_{CC}	3.135	3.3	3.465	V	
Power Dissipation	Pd	-	-	9	W	PAM4

Electrical Characteristic

Table3-Electrical Characteristic

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter						
Signaling Rate per Lane	VR	53.125 ± 100 ppm			Gbd	
Modulation format	-	PAM4				
Differential pk-pk input Voltage tolerance	Vin,pp,diff	750	-	-	mV	
Differential termination mismatchal	-	-	-	10	%	
Single-ended voltage tolerance range	-	-0.4	-	3.3	V	
DC common mode voltage	-	-350	-	2850	mV	
Receiver (each Lane)						
Signaling Rate per Lane	VR	53.125 ± 100 ppm			Gbd	
Modulation format	-	PAM4			-	
Differential output Voltage (Long mode)	-	-	-	845	mV	
Differential output Voltage (Short mode)	-	-	-	600	mV	
Near-end Eye height, differential	-	70	-	-	mV	
Far-end Eye height, differential	-	30	-	-	mV	
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	-	-350	-	2850	mV	

Optical Characteristics

Table4-Optical Characteristics

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

Notes:

[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

Pin Function Definitions

Table5-Pin Function Definitions

Pin	Symbol	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	ModeSelL	Module Select	
9	ResetL	Module Reset	
10	Vcc Rx	+3.3V Power Supply Receiver	
1 1	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.

Recommended Interface

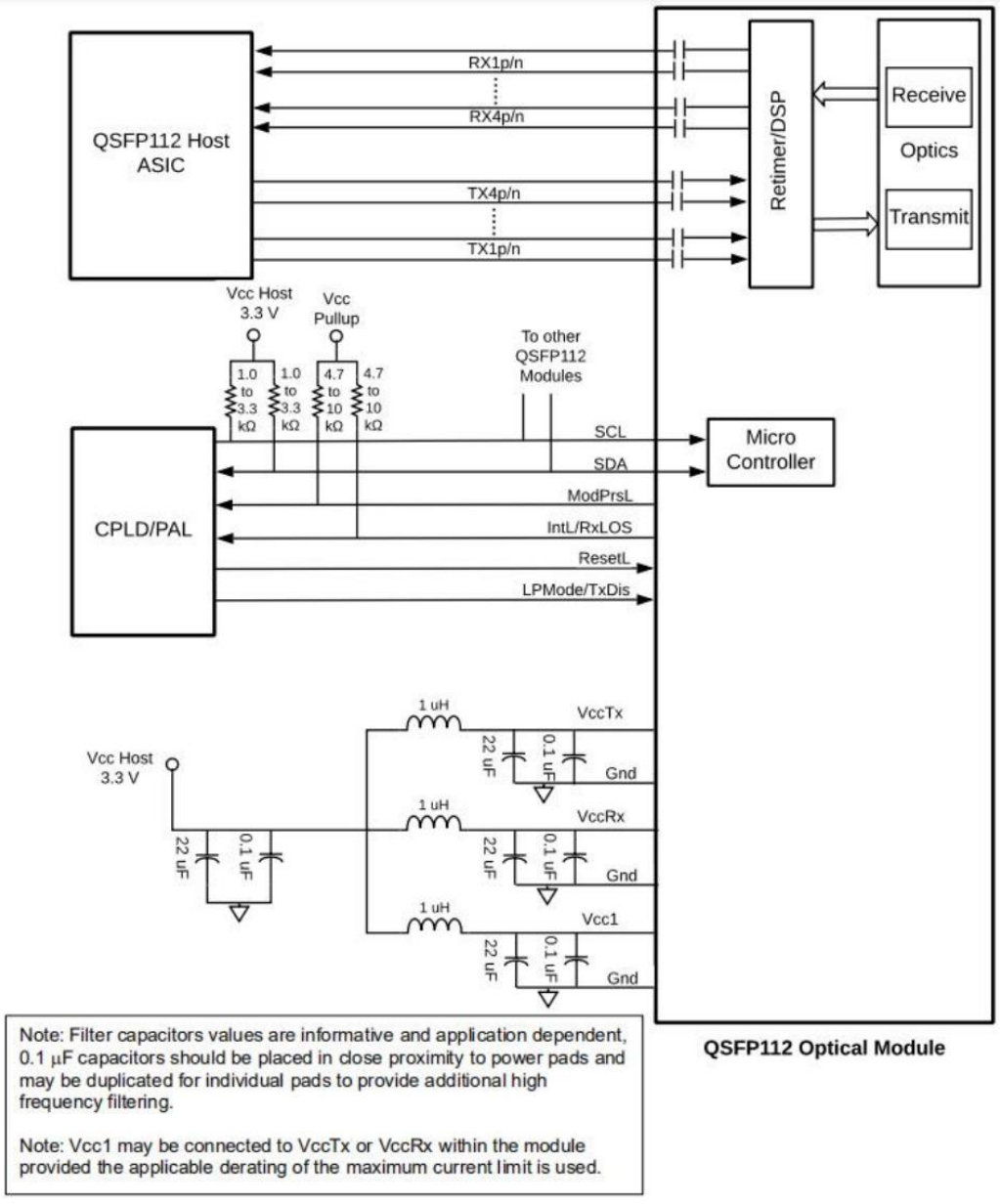

Figure 1 Recommended Interface Circuit

Pin arrangement

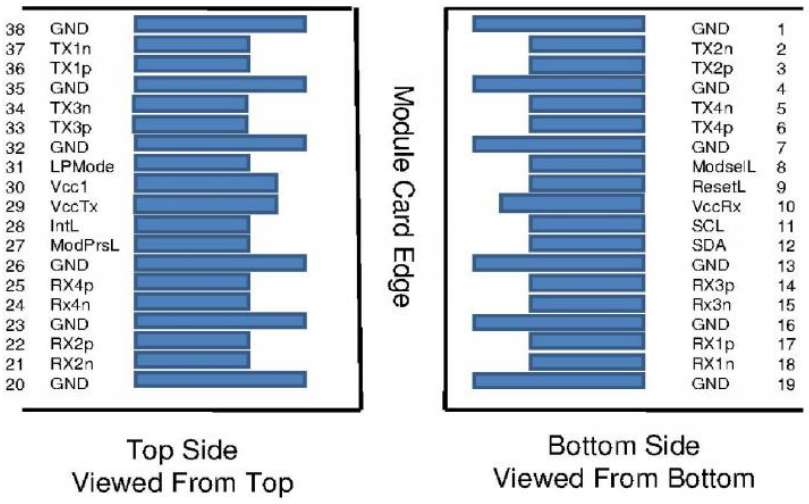

Figure 2 Pin View

Memory Map

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

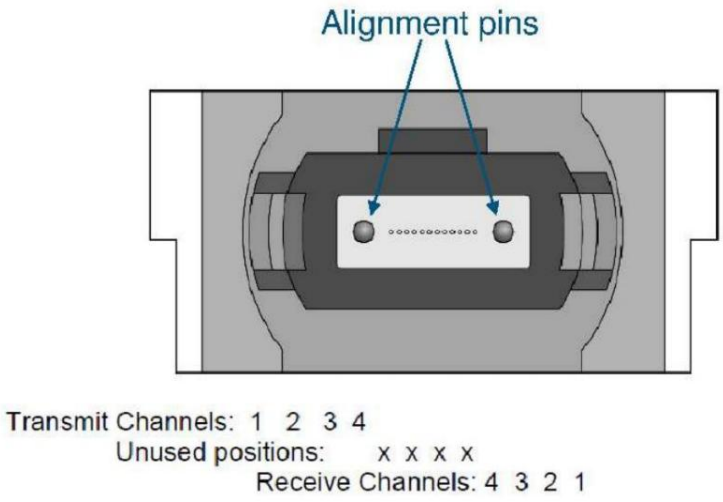

Figure 3 Transceiver Block Diagram

Mechanical

400G VR4 QSFP112 transceivers are compatible with QSFP112 MSA Specification Rev1.0 for pluggable form factor module.

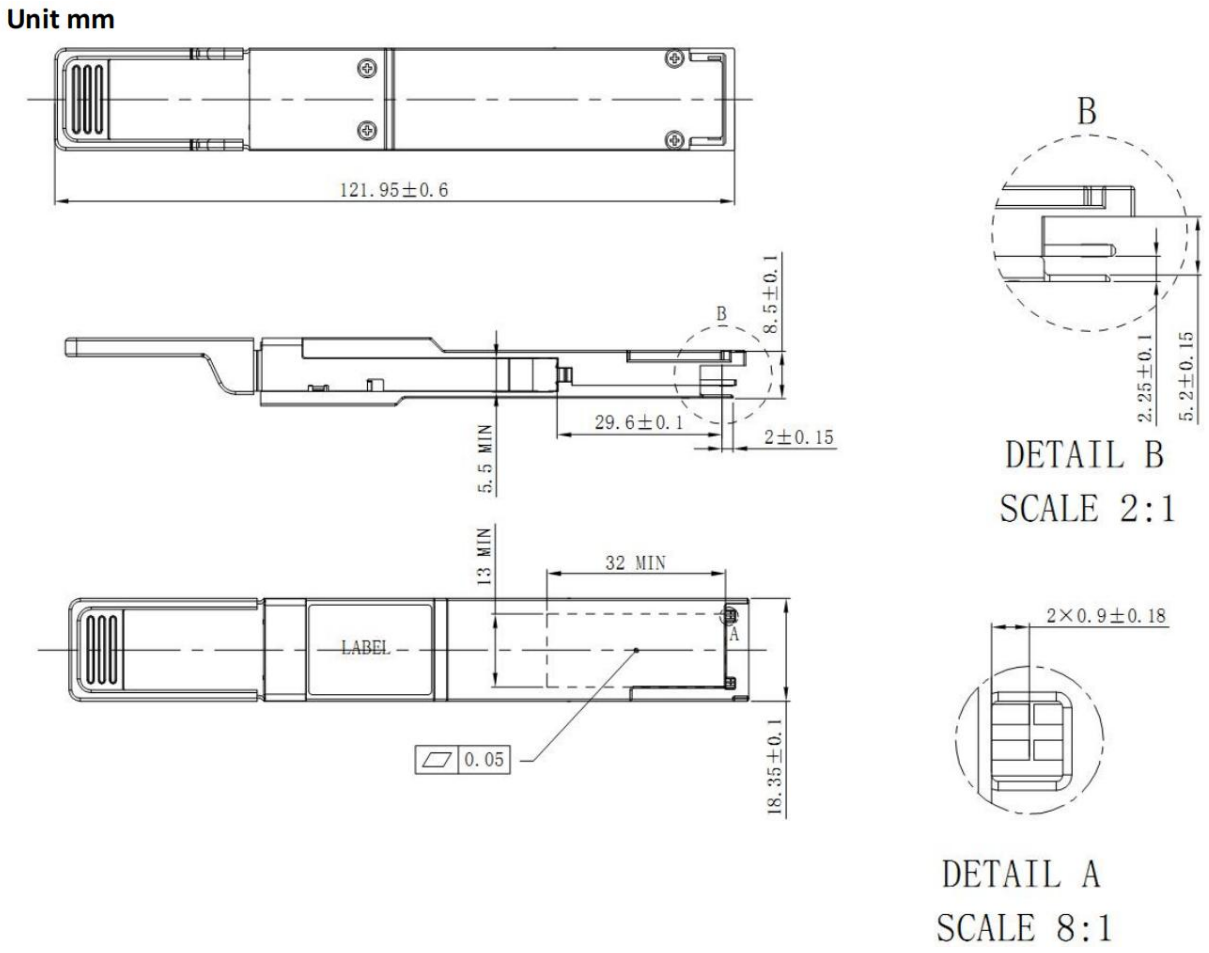

Figure 4 Mechanical Diagram

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