

Product Features

- Compliant to QSFP112 MSA
- Form Factor of QSFP112 Type2
- Parallel 4 Optical Lanes
- Maximum Power Consumption 10W
- Compliant with IEEE Std 802.3ck, IEEE Std 802.3bs
- MPO12 Receptacle with APC
- 4x106.25 Gb/s Electrical Interface (400 GAUI-4)
- Case operating temperature 0 to 70°C
- Up to 0.5km Transmission on Single Mode Fiber (SMF)
- Single +3.3V Power Supply
- RoHS Compliant

Application

- 400G Ethernet
- Data Centers and Enterprise Networking

Description

The 400G QSFP112 DR4 transceiver is designed for 0.5km optical communication applications and interconnection applications with digital diagnostics functions. The module converts 4 channels of 106.25Gb/s (PAM4) electrical input data to 4 channels of parallel optical signals, each channel of 106.25Gb/s operation for an aggregate data rate of 400Gb/s. An optical fiber cable with an MTP/MPO-12 connector can be plugged in to the 400G QSFP112 DR4 module receptacle. Support up to 0.5 km fiber transmission.

Absolute Maximum Ratings:

Parameter	Unit	Min.	Max.
Storage Temperature	°C	-40	85
Operating Relative Humidity	%	0	85
Power Supply Voltage	V	-0.5	3.63
Damage Threshold	dBm	5	

Recommended Operating Conditions:

Parameter	Unit	Min.	Typ	Max.
Operating Case Temperature	°C	0		70
Power Supply Voltage	V	3.135	3.3	3.465
Power Consumption	W			10
Link Distance (DR4)	m	0		500

Notes:

1. FEC is provided by host system.
2. FEC is required on host system to support maximum distance.

Electrical Characteristics:

Parameter	Min .	Typ.	Max.	Unit	Note
Transmitter					
Signaling Rate, Per Lane		53.125		GBd	
Differential Pk-pk Input Voltage Tolerance		900		mV	
Common-mode to Differential Return Loss	802.3ck Equation(1 20G-1)				
Effective Return Loss					
Differential Termination Mismatch			10	%	
Single-ended Voltage Tolerance Range	-0.4		3.3	V	
DC Common-mode Voltage	-350		2850	mV	
Receiver					
Signaling Rate Per Lane		53.125		GBd	
AC Common-mode Output Voltage(RMS)		-	17.5	mV	
Differential Peak-to-peak Output Voltage			900	mV	
Near-end Eye Height, Differential	24			mV	
Near-end Vertical Eye Closure			7.5	dB	

Far-end Eye Height, Differential	24			mV	
Far-end Vertical Eye Closure			7.5	dB	
Common Mode to Differential Conversion Return Loss	802.3ck			dB	
Differential Termination Mismatch			10	%	
DC Common Mode Voltage	-350		2850	mV	

Optical Characteristics:

Parameter	Unit	Min .	Typ.	Max.	Note
Transmitter					
Signaling Rate Each Lane	GBd		53.1 25		
Lane Wavelength Range	nm	1304.5	1310	1317.5	
Modulation Format		PAM4			
Average Optical Power Per Lane	dBm	-2.9		4	
Outer Optical Modulation Amplitude (OMA _{outer}), Each Lane	dBm	-0.8		4.2	
Average Launch Power Per Lane @ TX Off State	dBm			-15	
Launch Power in OMA _{outer} Minus T DECQ, Each Lane	dB	-2.2			
Transmitter and Dispersion Eye Closure for PAM4, Each Lane	dB			3.4	
Extinction Ratio	dB	3.5			
Relative Intensity Noise _{21 .4} (OMA)	dB/Hz			-136	
Side-Mode Suppression Ration (SMS R)	dB	30			
Optical Return Loss Tolerance	dB			21.4	
Transmitter Reflectance	dB			-26	
Receiver					
Signaling Rate Each Lane	GBd		53.125		
Lane Wavelength Range	nm	1304.5	1310	1317.5	
Modulation Format		PAM4			
Damage Threshold	dBm	5			

Average Receive Power, Each Lane	dBm	-5.9		4	
Receiver Power, Each Lane (OMA)	dBm			4.2	
Receiver Reflectance	dB			-26	
Receiver Sensitivity Each Lane (OMAouter)	dBm			-3.9	1
Stressed Receiver Sensitivity (OMAouter), Each	dBm			-1.9	
Stressed Eye Closure for PAM4 (SECQ) , Lane under Test	dB		3.4		
OMAouter of Each Aggressor Lane	dBm		4.2		
RX_LOS_Assert Min/Max	dBm	-15.0			
RX_LOS_De-Assert Min/Max	dBm			-8.9	
RX_LOS_Hysteresis	dB		1.5		

Notes:

1. Receiver sensitivity (OMAouter), each lane (max) is informative and is defined for a transmitter with a value of SECQ up to 3.4dB. It should meet Equation: $RS = \max(-3.9, -SECQ - 5.3)$, where RS is the receiver sensitivity, and SECQ is the SECQ of the transmitter used to measure the receiver sensitivity.

Pin Definition and Description

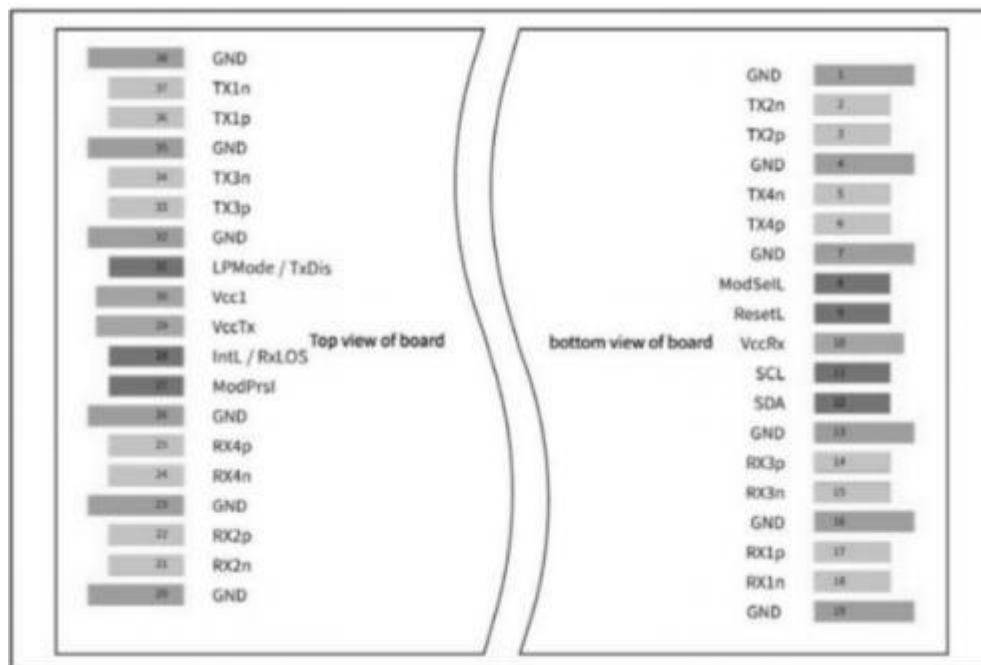


Table 1. Pin definition and descriptions

Pin	Symbol	Description	Plug Sequence	Note
1	GND	Ground	1	1
2	TX2n	Transmitted Inverted Data Input	3	
3	TX2p	Transmitted Non-Inverted Data Input	3	
4	GND	Ground	1	1
5	TX4n	Transmitted Inverted Data Input	3	
6	TX4p	Transmitted Non-Inverted Data Input	3	
7	GND	Ground	1	1
8	ModSel	Module Select	3	
9	ResetL	Module Reset	3	
10	VCC Rx	+3 .3 VDC Receiver Power Supply	2	2
11	SCL	Serial Clock for I2C Interface	3	
12	SDA	Serial Data for I2C Interface	3	
13	GND	Ground	1	1
14	RX3p	Receiver Non-Inverted Data Output	3	
15	RX3n	Receiver Inverted Data Output	3	
16	GND	Ground	1	1
17	RX1p	Receiver Non-Inverted Data Output	3	
18	RX1n	Receiver Inverted Data Output	3	
19	GND	Ground	1	1
20	GND	Ground	1	1
21	RX2n	Receiver Inverted Data Output	3	
22	RX2p	Receiver Non-Inverted Data Output	3	
23	GND	Ground	1	1
24	RX4n	Receiver Inverted Data Output	3	
25	RX4p	Receiver Non-Inverted Data Output	3	
26	GND	Ground	1	1
27	Mod PrsL	Module Present	3	
28	IntL/Rx LOS	Interrupt/optional Rx LOS	3	
29	VCCTx	+3 .3 VDC Transmitter Power Supply	2	2
30	VCC1	+3 .3 VDC Power Supply	2	2
31	LPMoDe/Tx d is	Low Power Mode/optioan ITx Disable	3	
32	GND	Ground	1	1
33	TX3p	Transmitted Non-Inverted Data Input	3	
34	TX3n	Transmitted Inverted Data Input	3	

35	GND	Ground	1	1
36	TX1p	Transmitted Non-Inverted Data Input	3	
37	TX1n	Transmitted Inverted Data Input	3	
38	GND	Ground	1	1

Notes:

1. GND is the symbol for signal and supply (power) common for the QSFP 112 module. All are common within the QSFP 112 module and all voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane.

2. VCC Rx, VCC 1 and VCC Tx are the receiver and transmitter power supplies and shall be applied concurrently. Requirements, defined for the host side of the Host Edge Card Connector, are listed in Table 3 .Optical Characteristics. Recommended host board power supply filtering is shown in Figure 3. VCC Rx, VCC 1 and VCC Tx may be internally connected within the QSFP 112 module in any combination . The connector pins are each rated for a maximum current of 1.5A (max. current of 2.0 A is required for high module power of 15-20W).

Digital Diagnostic Monitoring Functions

Parameter	Units	Error	Notes
Temperature Monitor	°C	±3	1LSB= 1/256 °C
Supply Voltage Monitor	V	±0.1	1LSB= 100uV
Bias Current Monitor	mA	±10%	1LSB=2uA
TX Power Monitor	dBm	±3	1LSB=0. 1uW
RX Power Monitor	dBm	±3	1LSB=0. 1uW

Mechanical Specifications

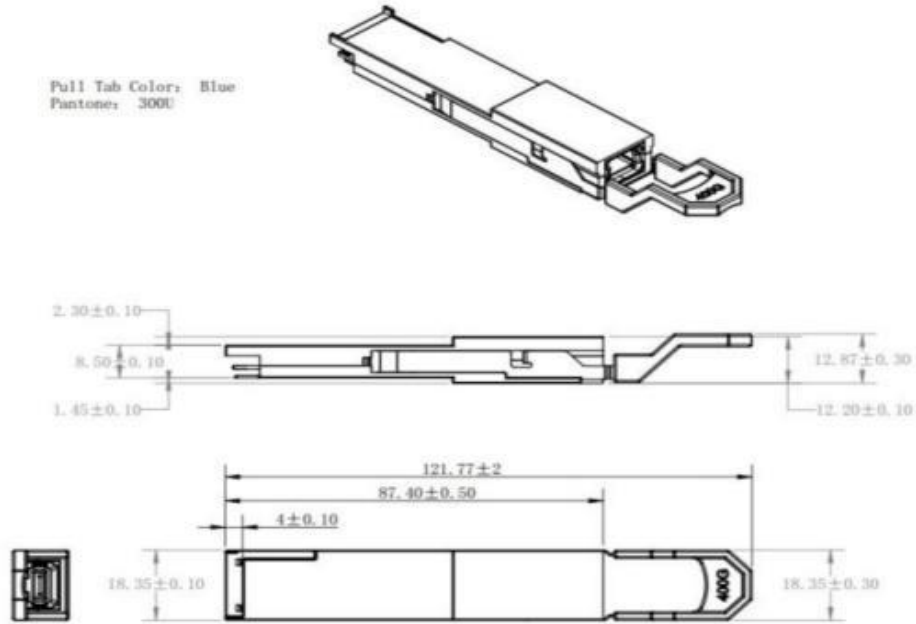


Figure 3. Mechanical dimensions