

Product Features

- Data Rate 106.25Gbps (PAM4) per channel
- 4x106.25G PAM4 VCSEL array
- MPO-12 APC connector
- Single +3.3V power supply
- DDM function implemented
- Hot-pluggable QSFP112 form factor
- Maximum link length of 100m on OM4/OM5(MMF)
- Case operating temperature 0 to 70°C
- Maximum power consumption 10W
- RoHS complaint

Applications

- 400GBASE-SR4 Ethernet
- Switch & Router Connections
- Data Centers
- Other 400G Interconnect Requirements

Description

The 400G QSFP112 SR4 Transceiver is designed to transmit and receive serial optical data links up to 106.25 Gb/s data rate (per channel) by PAM4 modulation format over multi-mode fiber. It is a small-form-factor hot pluggable transceiver module integrated Optical Extinction Ratio 2.5 dB with high performance VCSEL. It is compliant with 400G Ethernet specs and QSFP112 MSA.

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	2		500

Electrical Characteristics:

Parameter	Unit	Min	Typ	Max	Notes
Supply Voltage	V	3.14	3.3	3.47	
Supply Current	mA			3000	
Transceiver Power-on Initialize Time	ms			2000	
Transmitter					
PAM4 Signaling Rate Per Lane	GBd		53.125		PAM4
Single Ended Input Voltage Tolerance	V	-0.3		4.0	
Differential Data Input Swing	mVp-p			880	
Common Mode Noise (RMS)	mV			17.5	
Differential Differential Termination Resistance Mismatch	%			10	
Receiver					
PAM4 Signaling Rate Per Lane	GBd		53.125		
Single Ended Output Voltage	V			0.45	
Differential Data Output Swing	mVp-p			900	
Common Mode Noise (RMS)	mV			17.5	
Differential Differential Termination Resistance Mismatch	%			10	

Optical Characteristics:

Parameter	Unit	Min.	Typ.	Max.	Notes
Transmitter (Per Lane)					
Signaling Speed Per Lane	GBd		53.125±100pm		
Modulation Format			PAM4		
Center Wavelength	nm	844	850	863	
RMS Spectral Width	dB			0.6	
Average Launch Power Per Lane	dBm	-4.6		4	
Outer Optical Modulation Amplitude Per Lane	dBm	-2.6		3.5	
Transmitter Excursion, Each Lane	dB			2.3	
Transmitter and Dispersion Penalty Eye Closure for PAM4, Each Lane	dB			4.4	
Average Launch Power of Off Transmitter, Each Lane	dBm			-30	
Transmitter Transition Time	ps			17	
Optical Extinction Ratio	dB	2.5			
RIN12OMA	dB/Hz			-132	
Optical Return Loss Tolerance	dB			12	
Encircled Flux					≥86% at 19mm, ≤30% at 4.5 mm
Receiver (Per Lane)					
Signaling Speed Per Lane	GBd		53.125±10 0pm		
Modulation Format			PAM4		
Input Operating Wavelength	nm	842		948	
Damage Threshold Per Lane	dBm	5			
Average Receive Power Per Lane	dBm	-6.4		4	
Receive Power OMAouter Per Lane	dBm			3.5	
Receiver Reflectance	dB			-12	
Receiver Sensitivity (OMAouter), Each Lane	dBm			-4.6	
Stressed Sensitivity (OMAouter)	dBm			-2	

Pin Definition and Description

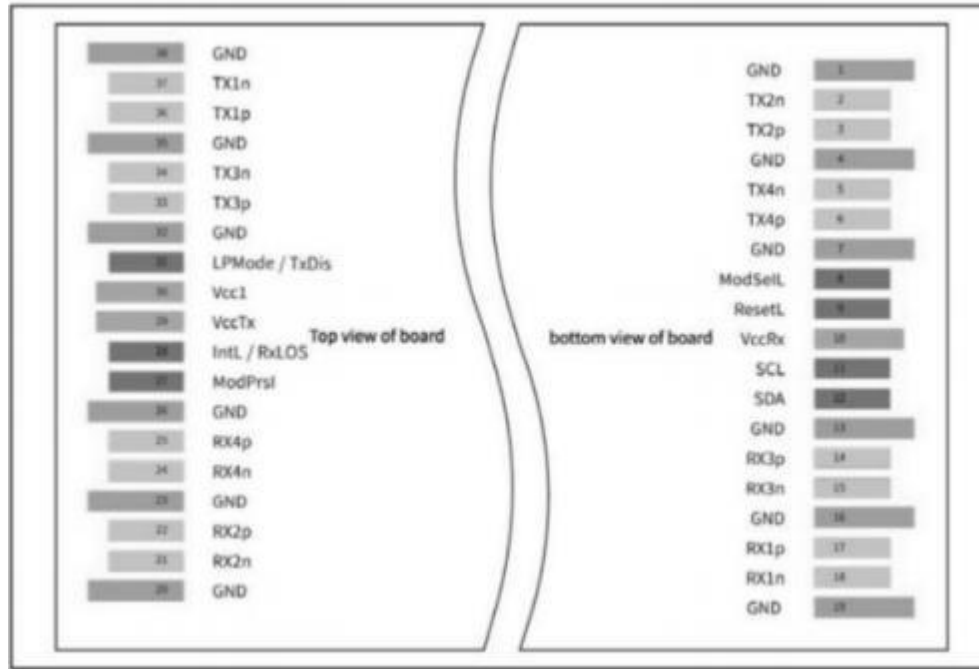


Table 1. Pin definition and descriptions

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

