200Gb/s QSFP56 HDR SR4 850nm 100m MMF Optical Transceiver

Features

- Up to 200Gb/s data rate
- Up to 100m on OM4 and 70m on OM3 multimode fiber at 200Gb/s
- 4x 50Gb/s PAM4 modulation
- Programmable Rx output amplitude and emphasis
- Adaptive Tx input equalizer
- SFF-8665 compliant QSFP56 port
- SFF-8636 DDM compliant
- Single 3.3V power supply
- 4.5W power dissipation
- BER 1E-15 with InfiniBand systems
- QSFP56 power class 5
- Class 1 laser safety
- Hot pluggable
- RoHS compliant
- IEEE 802.3 200GAUI-4 / 200GBASESR4 compliant
- SFF-8636 compliant I^2C management interface

Description

Q56-200G-SR4H transceiver is a 4-channel, pluggable, QSFP56, optical transceiver designed for use in 200Gb/s InfiniBand applications. This module incorporates integrated circuit technology in order to provide high performance. The transceiver operates over 4-lane parallel multi-mode fiber (MMF), using a nominal wavelength of 850nm, and is QSFP56 MSA compliant.

The transceiver has a standard SFF-8665 compliant QSFP56 connector on the electrical side towards the host system. The optical interface is composed of four optical channels/fibers in each direction, intended for a parallel multi-mode optical cable via a standard MPO-12 UPC connector. Each channel/fiber operates at signaling rates up to 26.5625GBd. Rigorous production testing ensures the best out-of-the-box installation experience, performance and durability.

The Q56-200G-SR4H transceiver has Digital Diagnostic Monitoring functions for supply voltage, temperature, laser bias current, optical transmit and receive levels with associated warning and alarm thresholds.The Q56-200G-SR4H transceiver will work with a fiber plant as specified in the QSFP MSA standard.

Absolute Maximum Ratings

Table1-Absolute Maximum Ratings

Parameter	Symbols	Min.	Typical	Max.	Unit	Notes
Storage Temperature	TSTG	-40		+85	°C	
Operating Relative Humidity (non-condensing)	RH	+5		85	%	1
Supply Voltage	Vcc	-0.3		3.6	V	
Receiver Damage Threshold per Lane	PRDMG	3.4			dBm	
Data input voltage	Vcc	-0.3		3.465	V	
Control input voltage	Vcc	-0.3		4.0	V	

Notes:

[1] No condensation

Recommended Operating Conditions

Table2-Recommended Operating Conditions

Parameter	Symbols	Min.	Typical	Max.	Unit	Notes
Case Temperature	Tc	0		+70	℃	
Supply Voltage	VCC	3.135	3.3	3.465	V	
Power Dissipation	Pd		4.5	5.0	W	
Supply noise tolerance (10Hz-10MHz)		66			mVpp	
Link Distance with G.652	D			100	m	

Electrical Characteristics

Table3-Electrical Characteristics

Parameter	Symbols	Min.	Typical	Max.	Unit	Notes
Transmitter						
Signaling rate (each lane)	SR	GBPS	26.5625 ± 100 ppm			
Differential data input voltage per lane	Vin,pp,diff	mV	900	-	-	
Differential termination mismatchal	-	%	-	-	10	
Single-ended voltage tolerance range	-	V	-0.4	-	3.3	
DC common mode voltage	-	mV	-350	-	2850	
Receiver						
Signaling rate (each lane)	SR	GBd	26.5625 ± 100 ppm			
Differential output voltage	-	mV	-	-	900	
Near-end ESMW (Eye symmetry mask width)	-	UI	0.265	-	-	
Near-end Eye height, differential (min)	-	mV	70	-	-	
Far-end ESMW (Eye symmetry mask width)	-	UI	0.2	-	-	
Far-end Eye height, differential (min)	-	mV	30	-	-	
Differential termination mismatch	-	%		-	10	
Transition time (min, 20% to 80%)	-	ps	9.5	-	-	
DC common mode voltage	-	mV	-350	-	2850	

Optical Characteristics

Table3-Optical Characteristics

Parameter	Symbols	Min.	Typical	Max.	Unit	Notes
Transmitter						
Signaling rate (each lane)	SR	GBd	26.5625 ± 100 ppm			
Modulation format	-	-	PAM4			
Lane wavelength	λ	nm	840	850	860	
RMS spectral width	Δ λ	nm	-	-	0.6	
Average launch power, each lane	-	dBm	-6.5	-	4	
Outer Optical Modulation Amplitude (OMAouter), each lane	-	dBm	-4.5	-	3	1
Launch power in OMAouter minus TDECQ, each lane	-	dBm	-5.9	-	-	
Transmitter and dispersion eye closure for PAM4 (TDECQ), each lane	-	dB	-	-	4.5	
Average launch power of OFF transmitter, each lane	-	dBm	-	-	-30	

Extinction ratio	-	dB	3	-	-	
Transmitter transition time, each lane	-	ps	-	-	34	
Optical return loss tolerance	-	dB	-	-	12	
Receiver						
Signaling rate (each lane)	SR	GBd	26.5625 ± 100 ppm			
Modulation format	-	-	PAM4			
Lane wavelength	λ	nm	840	850	860	
Damage threshold, each lane	P_{IN}	dBm	5	-	-	
Average receive power, each lane	-	dBm	-8.4	-	4	
Receive power (OMAouter), each lane	-	dBm	-	-	3	
Receiver sensitivity (OMAouter), each lane	-	dBm	-	-	Max(6.5,SECQ -7.9)	2
LOS Assert	-	dBm	-30	-	-10	
LOS De-Assert	-	dBm	-	-	-9	
LOS Hysteresis	-	dB	0.5	-	-	

Note:

1. Even if the TDECQ ＜ 1.4 dB, the OMAouter (min) must exceed this value.
2. Bit Error Ratio ＜ 2.4x10-4, Pattern PRBS31Q

Recommended Interface

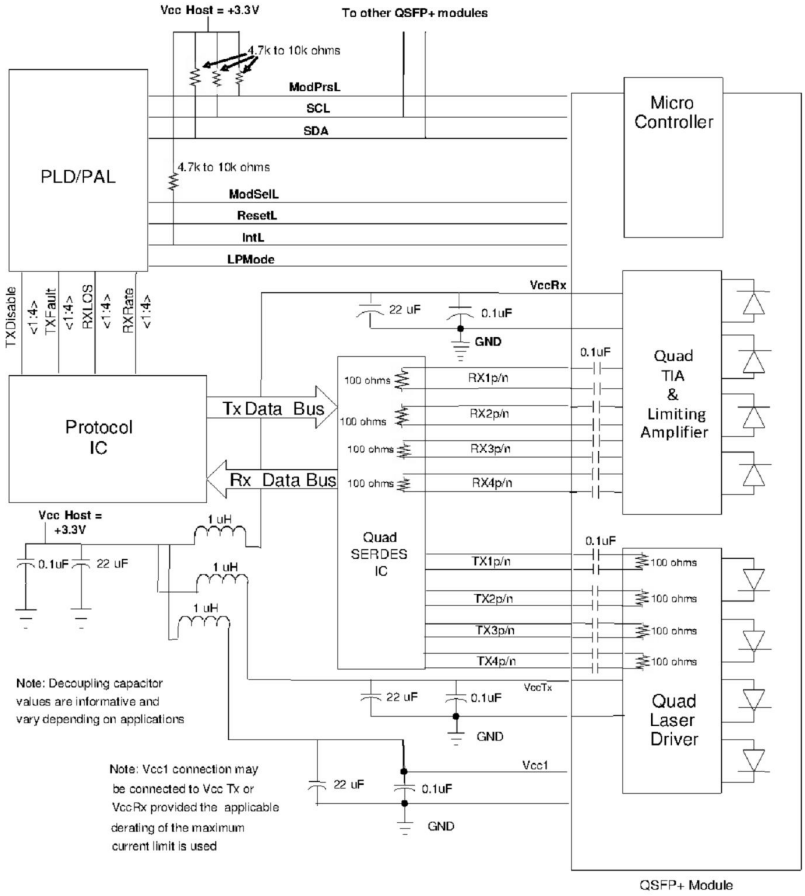

Figure 1 Recommended Interface Circuit

Pin arrangement

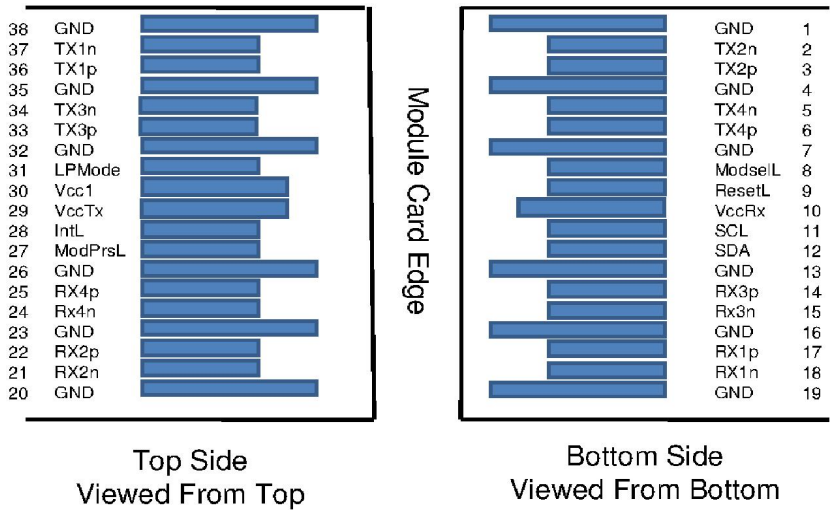

Figure 2 Pin View

Table4-Pin Function Definitions

Pin	Symbols	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	
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	Vcc Rx	+3.3V Power Supply Receiver	2
11	SCL	2-wire serial interface clock	
12	SDA	2-wire serial interface data	
13	GND	Ground	
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	1
19	GND	Ground	1
20	GND	Ground	
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	
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	VccTx	+3.3V Power supply transmitter	2
30	Vcc1	+3.3V Power supply	2
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

Optical interface arrangement

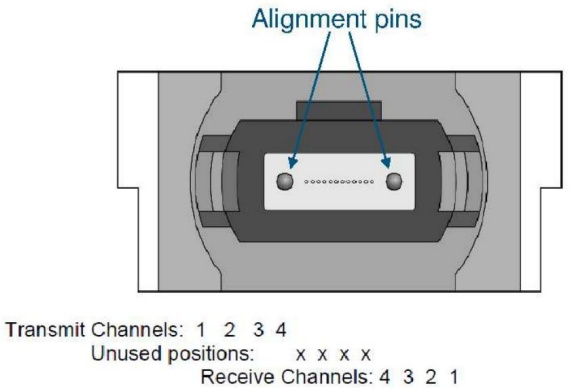

Figure 3 Optical interface arrangement

Mechanical Dimensions

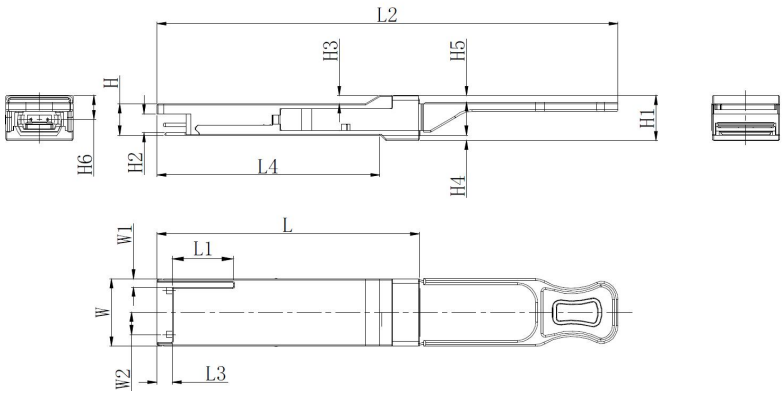

Figure 4 Mechanical Outline

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