

40Gb/s QSFP+ SR4 850nm 300m Optical Transceiver

Features

- Compliant to the industry standard SFF-8436 QSFP+ Transceiver Specification
- 4* 10.3125Gbps per module, bi-directional operation
- High reliability 850nm VCSEL array transmitter
- Hot pluggable
- Single 3.3V power supply, Low power consumption
- 0 to 70°C case temperature operating range
- RoHS-6 compliant (lead-free)

Applications

- 10GBASE-SR & 40GBASE-SR4 40G Ethernet
- Datacom/Telecom Switch & Router connections
- High speed multi-channel parallel data connections

Compliance

- IEEE802.3ba 40GBASE-SR4
- SFF-8436 QSFP Specification

Description

QSFP-40G-CSR4 transceiver is a Parallel 40Gb/s Quad Small Form-factor, Hot-Pluggable optical module. The module integrates 4 independent transmitters and 4 independent receivers inside. Four-channel 850nm VCSEL array, PIN array, amplifier and Driver are used in the module for compact size, low power consumption and low cost. Each channel can operate at 10Gbps up to 300m using OM3 fiber.

The transceiver is compliant to the industry standard SFF-8436 QSFP+ Transceiver Specification. Digital diagnostic function provided to monitor the working state of the module. The electrical interface uses a 38 contact edge type connector. The optical interface uses an 8 or 12 fiber MTP (MPO) connector.

QSFP-40G-CSR4 transceiver features small size, parallel multi-channel, hot-pluggable, low power and high speed operation. It's very suitable for high speed short-distance density data connections such as 40G BASE-SR4, Switch & Route interconnects etc.

Absolute Maximum Ratings

Table1-Absolute Maximum Ratings

Parameter	Symbols	Min.	Typical	Max.	Unit	Notes
Storage Temperature	TSTG	-40		+85	°C	
3.3V Supply Voltage	VCC	-0.5		+3.6	V	
Operating Temperature	Top	0		70		
Operating Relative Humidity	RH	5		85	%	

Recommended Operating Conditions

Table2-Recommended Operating Conditions

Parameter	Symbols	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	Tc	0		+70	°C	
3.3V Supply Voltage	VCC	3.135	3.3	3.465	V	
Data Rate			41.25		Gbps	
Receiver Differential Data Output Load			100		Ohms	
Logic Input Voltage High	Vih	2		Vcc+0.3	V	
Logic Input Voltage Low	Vih	-0.3		0.8	V	
Two wire Serial Interface Clock Rate			100	400	KHz	
Power Supply Noise				50	mVpp	
Fiber Length(OM3 2000MHz*Km)		0.5		300	m	MTRQ-4S100 MTRQ-4S300

Electrical Characteristic

Table3-Electrical Characteristic

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transceiver Power Consumption				1.5	W	
Transceiver Power Supply Current				475	mA	
Maximum peak Current				900	mA	
Transceiver Power On Initialization Time	Tini			2000	ms	
Transmitter						
Differential Data Input Voltage Peak to Peak Swing	Vin,pp	190		700	mV	
Differential Input Impedance	Zind	90	100	110	ohm	AC Coupled Inside Module
AC common-mode input voltage tolerance(RMS)		15			Nm	
Differential input return loss			Per IEEE P802.3ba, Section 86A.4.1.1		dB	10 MHz to 11.1 GHz
J2 Jitter Tolerance	Jt2			0.3	UI	
J9 Jitter Tolerance	Jt9			0.47	UI	
Eye mask coordinates: [X1, X2, Y1, Y2]			0.11, 0.31 95, 350		UI mV	Hit ratio = 5 × 10-5
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3}			0.23,0.34,0.43 0.27,0.35,0.4		UI	Hit ratio = 5 × 10-5
Receiver						
Differential Data Output Voltage Peak to Peak Swing	Vopp	300		850	mV	
Differential output Impedance	Zos	90	100	110	Ohms	AC Coupled Inside Module
Differential output return loss			Per IEEE P802.3ba, Section 86A.4.2.1		dB	10 MHz to 11.1 GHz
J2 Output	Jo2			0.42	UI	
J9 Output	Jo9			0.65	UI	
Eye mask coordinates: [X1, X2, Y1, Y2]			0.29, 0.5 150, 425		UI mV	10,Hit ratio = 1 × 10-12

Optical, Electrical Characteristic

Table4- Transmitter Operating Characteristic-Optical

Parameter	Symbols	Min.	Typical	Max.	Unit	Notes
Center wavelength	λ_c	840	850	860	nm	
RMS spectral width	SW			0.65	nm	
Average power, each lane(EOL)	TXP	-7.5		1	dBm	
Extinction Ratio		3			dB	
TDP per Lane	TDP			3.5	dB	
Launch Power in OMA minus TDP, each lane		-6.5			dBm	
Optical Return Loss Tolerance				12	dB	
Average launch power of OFF transmitter, per lane				-30	dBm	
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3}		10%			IEEE802.3ba	Hit ratio = 1×10^{-12}

Table5- Receiver Operating Characteristic-Optical

Parameter	Symbols	Min.	Typical	Max.	Unit	Notes
Center wavelength	λ_c	840	850	860	nm	
Saturation power (EOL)		2.4			dBm	
Max Input power		2.4			dBm	
Average power at receiver input, each lane		-9.9		2.4	dBm	
Receive Power (OMA) per Lane				3	dBm	
Peak Power, per lane				4	dBm	
Sensitivity (OMA EOL), each lane				-11.1	dBm	
Receiver Reflectance				-12	dBm	
Receiver jitter tolerance [OMA], each Lane				-5.4	dBm	
Rx_Loss assert	LOSA	-30			dBm	
Rx_LossDe_assert	LOSD			-12	dBm	
LOS Hysteresis		0.5			dB	
Rx output squelch function			Yes			

Rx LOS in signal or RSSI			RSSI			
Laser status in reset			Close			

Pin Description

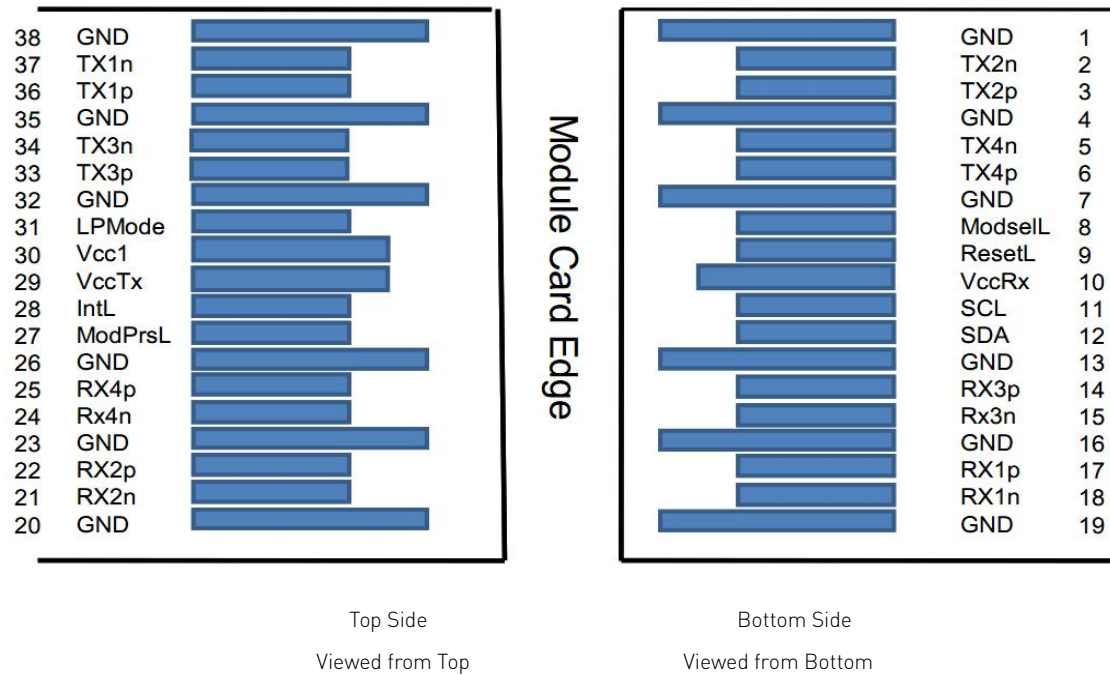


Figure 1 Pin view

Pin Function Definitions

Table4-Pin Function Definitions			
Pin	Symbol	Description	Note
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	ModSelL	Module Select	
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	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	Rx1p	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	
24	Rx4n	Receiver Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output Ground	
26	GND	Ground	1
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	Vcc Tx	+3.3V Power supply transmitter	2
30	Vcc1	+3.3V Power supply	2
31	Mode	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

Notes:

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

[2] Vcc Rx, Vcc1 and Vcc Tx are the receiver and transmitter power supplies and shall be applied concurrently. Recommended host board power supply filtering is shown in Figure 7. Vcc Rx Vcc1 and VccTx may be internally connected within the QSFP+ Module in any combination. The connector pins are each rated for a maximum current of 500 mA.

Optical interface arrangement

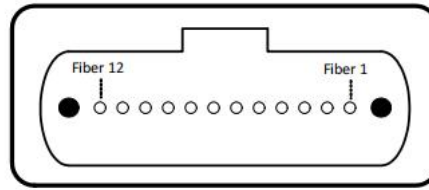


Figure 2 Outside View of the QSFP+ Module MPO receptacle

Transceiver Block Diagram

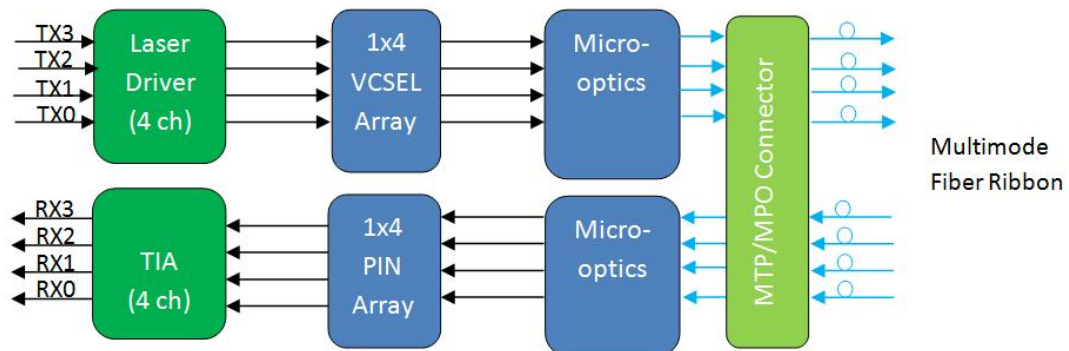


Figure 3 Transceiver Block Diagram

	L	L1	L2	L3	L4	W	W1	W2	H	H1	H2	H3	H4	H5	H6
Max	72.2	-	128	4.35	61.4	18.45	-	6.2	8.6	12.4	5.35	2.5	1.6	2.0	-
Type	72.0	-	-	4.20	61.2	18.35	-	-	8.5	12.2	5.2	2.3	1.5	1.8	6.55
Min	68.8	16.5	124	4.05	61.0	18.25	2.2	5.8	8.4	12.0	5.05	2.1	1.3	1.6	-

Recommended Interface

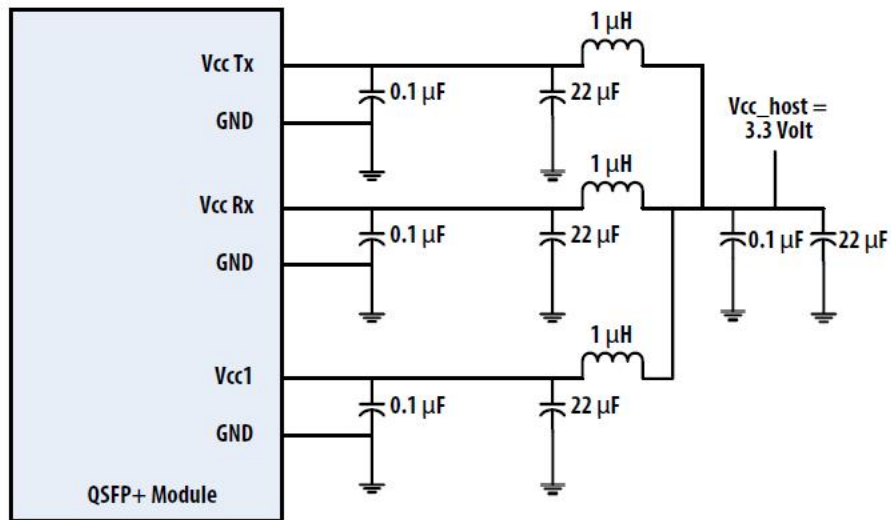


Figure 4 Recommended Interface Circuit

Mechanical Dimensions

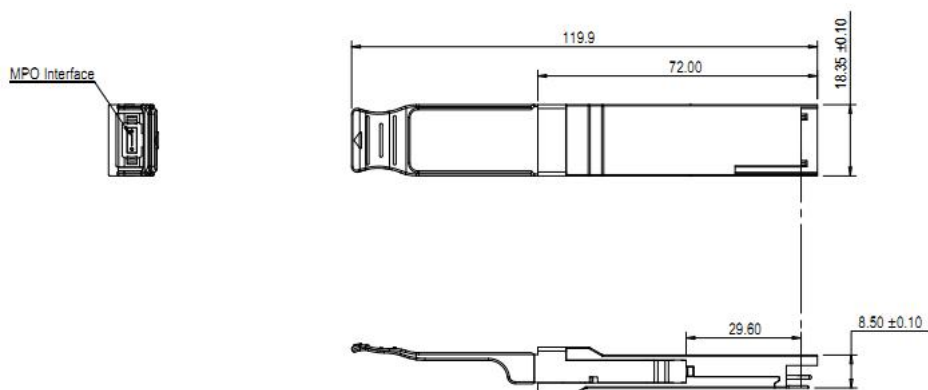


Figure 4 Mechanical Dimensions

Further Information:

Web www.naddod.com

Email For order requirements: sales@naddod.com
For customer service: support@naddod.com
For technical support: tech@naddod.com

For cooperation: agency@naddod.com

For other informations: info@naddod.com

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