

# 100Gb/s QSFP28 SR4 850nm100m Optical Transceiver

## Features

- Support data rate 103.125Gbps
- Up to 70m over OM3 and 100m over OM4
- 4 channels 850nm VCSEL array
- 4 channels PIN photo detector array
- DDM function implemented
- Single MPO connector receptacle
- Hot Pluggable QSFP28 form factor
- Single +3.3V power supply
- Power consumption less than 3.5W
- Operating case temperature: 0 ~70°C

## Applications

- 100GBASE-SR4 Ethernet
- Wireless Front haul
- Datacom/Telecom switch & router connections

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## Compliance

- Compliant with SFF-8665
- Compliant with IEEE 802.3bm
- Compliant with OIF-CEI-04.0
- GR-468-CORE
- RoHS compliance

## Description

QSFP-100G-SR4 is a four-channel, parallel, Fiber-Optic QSFP28 transceiver compliant with 100GBASE-SR4 PMD. This transceiver is a high performance module for short-reach multi-lane data communication and interconnects applications. It integrates four data lanes in each direction and each lane can operate at 25.78125Gbps up to 70m over OM3 or 100m over OM4 fiber.

These modules are designed to operate over multi-mode fiber systems using a nominal wavelength of 850nm. The electrical interface uses a 38 contact edge type connector. The optical interface uses a 12 fiber MTP (MPO) connector.

A serial EEPROM in the transceiver allows the user to access transceiver monitoring and configuration data via the 2-wire QSFP Management Interface. This interface uses a single address, A0h, with a memory map divided into a lower and upper area. Basic digital diagnostic (DD) data is held in the lower area while specific data is held in a series of tables in the high memory area.

## Absolute Maximum Ratings

Table1-Absolute Maximum Ratings						
Parameter	Symbols	Min.	Typical	Max.	Unit	Notes
Storage Temperature	TSTG	-40		+85	°C	
Supply Voltage	Vcc3	0		3.63	V	
Relative Humidity	RH	5		85	%	
Rx Input Average Power	P <sub>max</sub>			3.4	dBm	

## Recommended Operating Conditions

Table2-Recommended Operating Conditions						
Parameter	Symbols	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	Top	0		+70	°C	
Power Supply Voltage	VCC	2.97	3.3	3.465	V	
	ICC3			600	mA	
Power Dissipation	PD			3.5	W	
Data Rate			103.125		Gbps	
Transmission Distance				70	m	OM3
				100	m	OM4

## Electrical Characteristic

Table3-Electrical Characteristic						
Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Input differential impedance			100		Ω	
Output differential impedance			100		Ω	

Differential data input swing		180		700	mV	
Differential data output swing				900	mV	
Differential data output Eye Width	EW	0.57			UI	
Differential data output Eye Height	EH	228			mV	
Differential data output Vertical eye closure	VEC			5.5	dB	
Optical Transmitter Characteristics						
Center Wavelength	$\lambda$ C	840	850	860	nm	
RMS Spectral width				0.6	nm	
Average launch power, each lane	P	-8.4		2.4	dBm	
Optical Modulation Amplitude (OMA), each lane	OMA	-6.4		3	dBm	
Launch power in OMA minus TDEC		-7.3			dBm	
Transmitter and dispersion eye closure (TDEC), each lane	TDEC			4.3	dB	
Optical Power for TX DISABLE				-30	dBm	
Extinction Ratio	ER	2			dB	
Optical Return Loss Tolerance				12	dB	
Signaling rate, each lane			25.78125		Gbps	
Optical eye mask	Compliant with IEEE std 802.3bm-2015					
Optical Receiver Characteristics						
Center Wavelength	$\lambda$ r	840	850	860	nm	
Average Receiver Sensitivity(AVG)				-9.2	dBm	
Stressed Receiver Sensitivity(OMA)				-5.2	dBm	
Saturation power		2.4			dBm	
Damage threshold		3.4			dBm	
LOS Assert	LOS_A	-30			dBm	
LOS Dessert	LOS_D			-13	dBm	2
LOS Hysteresis		0.5		5	dB	
Receiver Reflectance				-12	dB	
Signaling rate, each lane					Gbps	

Notes:

[1]Test conditions: ER = 2.5 dB, PRBS31, BER =5E-5

[2]Test conditions: Stressed eye closure (SEC) = 4.3 dB, Stressed eye J2 Jitter = 0.39 UI, Stressed eye J4 Jitter = 0.53 UI, OMA = 3dBm, Stressed receiver eye mask {X1, X2, X3, Y1, Y2, YR} {0.28, 0.5, 0.5, 0.33, 0.33, 0.4}

## Pin Description

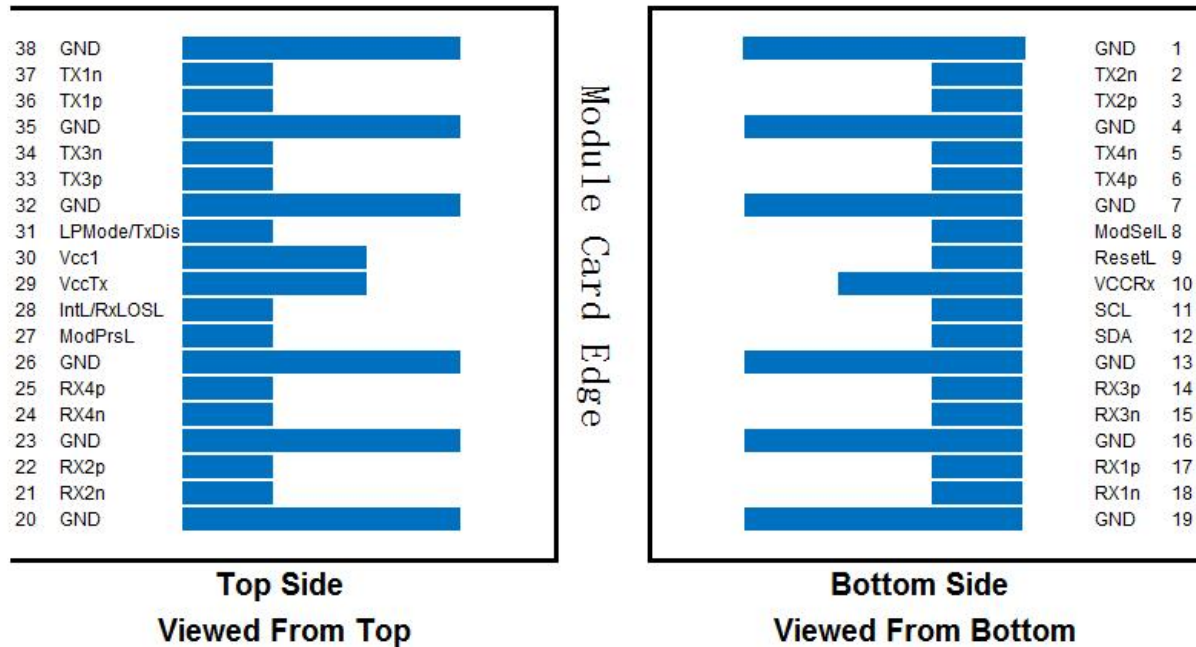


Figure 1 Pin view

## Pin Function Definitions

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

**Notes:**

[1] GND is the symbol for signal and supply (power) common for the QSFP28 module. All are common within the QSFP28 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 VccTx 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 QSFP28 Module in any combination. The connector pins are each rated for a maximum current of 500 mA.

## Transceiver Block Diagram

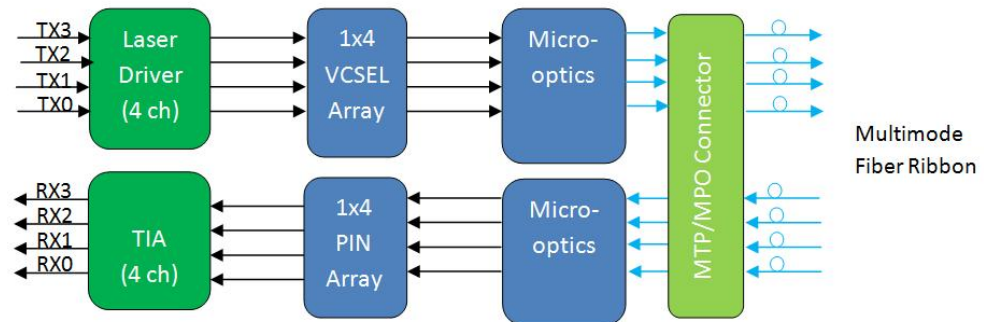


Figure 2 Transceiver Block Diagram

## Optical Interface Lanes and Assignment

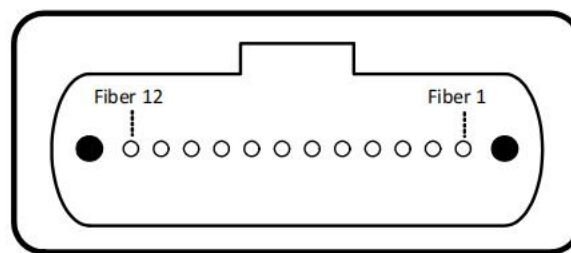


Figure 3 Outside View of the QSFP28 Module MPO Receptacle

## ESD

This transceiver is specified as ESD threshold 1kV for high speed data pins and 2kV for all other electrical input pins, tested per MIL-STD-883, Method 3015.4 /JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

## Laser Safety

This is a Class 1 Laser Product according to EN 60825-1:2014. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

Caution: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

## Further Information:

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Web [www.naddod.com](http://www.naddod.com)

Email For order requirements: [sales@naddod.com](mailto:sales@naddod.com)  
For customer service: [support@naddod.com](mailto:support@naddod.com)  
For technical support: [tech@naddod.com](mailto:tech@naddod.com)

For cooperation: [agency@naddod.com](mailto:agency@naddod.com)

For other informations: [info@naddod.com](mailto:info@naddod.com)

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PNY Technologies Europe  
9 rue Joseph Cugnot  
33708 Mérignac cedex | France  
T +33 (0)5 40 240 240 | [pnipro@pny.eu](mailto:pnipro@pny.eu)

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