LQ-SW100-SR4C

100G QSFP28 SWDM4 Optical Transceiver

Product Features

- Compliant with QSFP28 MSA
- Compliant with SWDM MSA
- Compliant with SFF-8636
- Compliant with IEEE 802.3bm CAUI-4
- Hot-pluggable QSFP28 form factor
- 4x25Gb/s 850nm VCSEL-based transmitter
- Supports 103.1Gbps aggregate bit rate
- Power dissipation<3.5W</p>
- Maximum link length of 150m on OM5 multimode Fiber
- Case temperature range of 0°C to 70°C
- Duplex LC receptacles
- CAUI-4 electrical interface
- > RoHS compliant
- Operating case temperature:

Standard: 0 to +70°C



Applications

100G Ethernet over Duplex MMF

Standards

- Compliant to IEEE 802.3bm
- 100GBASE-SR4 Ethernet links
- Compliant to SFF-8436

General Description

The Link-PP 100G QSFP28 SWDM4 transceiver modules are designed for use in 100G Ethernet links over duplex multimode fiber. Four channels/lanes in the 850-940nm region @ 25.78Gbps to transport the Ethernet signal. Digital diagnostics functions are available via an I2C interface, as specified by the QSFP28 MSA.



Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Units
Storage Temp Range	Ts	-40	+85	$^{\circ}$
Supply Voltage	Vcc	-0.5	3.6	V
Relative Humidity	RH	15%	85%	

Operating Conditions

Parameter	Symbol	Min	Max	Units
Case Temp-Operating	Tcase	0	70	$^{\circ}$
Supply Voltage	Vcc	3.14	3.46	V
Power Consumption	Р		3.5	W
Link Distance on OM3 Fiber			75	M
Link Distance on OM4 Fiber			100	М
Link Distance on OM5 Fiber			150	М

Optical Characteristics

Transmitter Parameter		Min	Typical	Max	Unit	Note
Signaling rate, each lane		25.78	25.78125±100ppm			
Lane Wavelength Range		844 874 904 934		858 888 918 948	nm	
Modulation Format			NRZ			
Difference in launch power between any two lanes				4.5	dBm	
RMS Spectral width				0.59	nm	1
Optical Modulation Amplitude (OMA), each lane		-5.5		3	dBm	2
Average Launch Power per Lane @ TX Off State				-30	dBm	
Launch Power in OMA minus TDEC	Lane0 Lane1 Lane2 Lane3	-7 -7 -7.4 -7.7			dBm	
Transmitter and Dispersion Eye Closure	Lane0 Lane1 Lane2 Lane3			4 4 4.4 4.8	dB	3

Extinction Ratio		2			dB	
Optical Return Loss Tolerance				12	dB	
Encircled Flux			≥86% at ≤30% at 4			4
Fransmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3} Hit ratio 1.5x10-3 hits per sample		{0.3	,0.38,0.45,0	.35,0.41,0	.5}	

Notes:

- 1. RMS spectral width is the standard deviation of the spectrum.
- 2. The normative lowest value of OMA for a compliant transmitter is 'Launch power in OMA minus TDEC, each lane (min)' plus the actual value of 'TDEC', but with a value of at least 'OMA, each lane (min)'.
- 3. TDEC is calculated from the measured TDECm using the methods in 3.6. TDECm is measured following the method in IEEE 802.3 clause 95.8.5 using a 12.6 GHz bandwidth reference receiver for all lanes.
- 4. If measured into type A1a.2 or type A1a.3 50 um fiber in accordance with IEC 61280-1-4.

Receiver Parameter	Lane	Min	Typical	Max	Unit	Note
Signaling rate, each lane		25.78	8125±100p	pm	Gb/s	
	Lane0	844		858		
Lana Mayalanath Danas	Lane1	874		888		
Lane Wavelength Range	Lane2	904		918	nm	
	Lane3	934		948		
Modulation Format			NRZ			
Damage Threshold		4.4			dBm	
	Lane0	-9.5			dBm	
	Lane1	-9.4		3.4		
Average Receive Power, each lane	Lane2	-9.4				
	Lane3	-9.4				
Receiver Power, each lane (OMA)				3	dBm	
Receiver Reflectance				-12	dB	
	Lane0			-8.2		
unStrassed Deseiver Consitivity (ONAA)	Lane1			-8.4	dBm	4
unStressed Receiver Sensitivity(OMA)	Lane2			-8.6	ивт	1
	Lane3			-8.8		
RX_Los_Assert		-30			dBm	
RX_Los_De-ASSERT				-12	dBm	
RX_Los_Hysteresis		0.5			dBm	

1.unstressed sensitivity at BER of 5E-5(pre FEC)

Digital Diagnostic Monitoring Specifications



Parameters	Unit	Specification
Temperature Monitor	°C	±3
Voltage Monitor	V	±5 %
I_bias Monitor	mA	±10 %
Received Power (Rx) Monitor	dB	±3.0
Transmit Power (Tx) Monitor	dB	±3.0

Electrical Characteristics

Transmitter electrical input signal characteristics(TP1)	Min	Typical	Max	Unit	
Signaling rate per lane (range)	25.78125	25.78125 ±100 ppm			
Differential input return loss	Equation (83E–5)			dB	
Differential to common mode input return loss	Equation (83E–6)			dB	
Differential termination mismatch			10	%	
Module stressed input test	See 83E3.4.1				
Differential pk-pk input voltage tolerance	900			mV	
DC common mode voltage	-350		2850	mV	
Single ended voltage tolerance range	-0.4		3.3	V	
Signaling rate per lane (range)	25.78125	25.78125 ±100 ppm			
AC common-mode output voltage (RMS)			17.5	mV	
Differential output voltage			900	mV	
Eye width	0.57			UI	
Eye height, differential	228			mV	
Vertical eye closure			5.5	dB	
Differential output return loss	Equation (83E–2)			dB	
Common to differential mode conversion return loss	Equation (83E–3)			dB	
Differential termination mismatch			10	%	
Transition time (20% to 80%)	12			ps	
DC common mode voltage	-350		2850	mV	

QSFP28 Connector and Pinout Description

The electrical interface to the transceiver is a 38 pins edge connector. The 38 pins provide high speed data, low speed monitoring and control signals, I2C communication, power and ground connectivity. The top and bottom views of the connector are provided below, as well as a table outlining the contact numbering, symbol and full description.

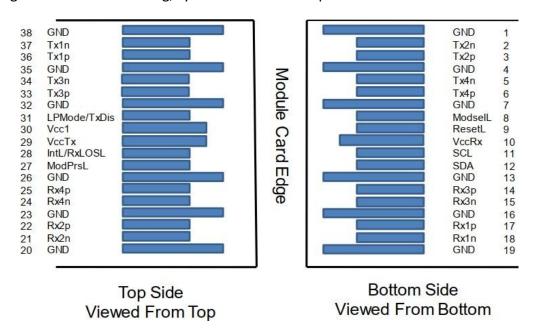


Figure 1. QSFP28-compliant 38-pin connector

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1 GND Transmitter Ground (Common with Receiver Ground) 2 Tx2n Transmitter Inverted Data Input 3 Tx2p Transmitter Non-Inverted Data output 4 GND Transmitter Ground (Common with Receiver Ground) 5 Tx4n Transmitter Ground (Common with Receiver Ground) 6 Tx4p Transmitter Ground (Common with Receiver Ground) 7 GND Transmitter Ground (Common with Receiver Ground) 8 ModSelL Module Select 9 ResetL Module Reset 10 VccRx 3.3V Power Supply Receiver 2 2-Wire serial Interface Clock 11 SCL 2-Wire serial Interface Data 13 GND Transmitter Ground (Common with Receiver Ground) 14 Rx3p Receiver Non-Inverted Data Output 15 Rx3n Receiver Inverted Data Output 16 GND Transmitter Ground (Common with Receiver Ground) 17 Rx1p Receiver Non-Inverted Data Output 18 Rx1n Receiver Inverted Data Output 19 GND Transmitter Ground (Common with Receiver Ground) 10 GND Transmitter Ground (Common with Receiver Ground) 11 Rx2n Receiver Non-Inverted Data Output 12 Rx2n Receiver Non-Inverted Data Output 13 Rx2n Receiver Non-Inverted Data Output 14 Rx2n Receiver Inverted Data Output 15 Rx2n Receiver Inverted Data Output 16 GND Transmitter Ground (Common with Receiver Ground) 1 Transmitter Ground (Common with Receiver Ground) 1 Rx2n Receiver Inverted Data Output 10 GND Transmitter Ground (Common with Receiver Ground) 1 Rx2n Receiver Inverted Data Output 10 GND Transmitter Ground (Common with Receiver Ground) 1 Rx2n Receiver Inverted Data Output 10 GND Transmitter Ground (Common with Receiver Ground) 1 T	Pin	Symbol	Name/Description	NOTE
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21Rx2nReceiver Inverted Data Output22Rx2pReceiver Non-Inverted Data Output23GNDTransmitter Ground (Common with Receiver Ground)124Rx4nReceiver Inverted Data Output2525Rx4pReceiver Non-Inverted Data Output126GNDTransmitter Ground (Common with Receiver Ground)127ModPrslModule Present228IntLInterrupt229VccTx3.3V power supply transmitter230Vcc13.3V power supply231LPModeLow Power Mode, not connect32GNDTransmitter Ground (Common with Receiver Ground)133Tx3pTransmitter Non-Inverted Data Input34Tx3nTransmitter Inverted Data Output35GNDTransmitter Ground (Common with Receiver Ground)136Tx1pTransmitter Non-Inverted Data Input37Tx1nTransmitter Inverted Data Output	19	GND		1
22Rx2pReceiver Non-Inverted Data Output23GNDTransmitter Ground (Common with Receiver Ground)124Rx4nReceiver Inverted Data Output2525Rx4pReceiver Non-Inverted Data Output126GNDTransmitter Ground (Common with Receiver Ground)127ModPrslModule Present228IntLInterrupt229VccTx3.3V power supply transmitter230Vcc13.3V power supply231LPModeLow Power Mode, not connect32GNDTransmitter Ground (Common with Receiver Ground)133Tx3pTransmitter Non-Inverted Data Input34Tx3nTransmitter Inverted Data Output35GNDTransmitter Ground (Common with Receiver Ground)136Tx1pTransmitter Non-Inverted Data Input37Tx1nTransmitter Inverted Data Output	20	GND	Transmitter Ground (Common with Receiver Ground)	1
23GNDTransmitter Ground (Common with Receiver Ground)124Rx4nReceiver Inverted Data Output2525Rx4pReceiver Non-Inverted Data Output2626GNDTransmitter Ground (Common with Receiver Ground)127ModPrslModule Present228IntLInterrupt229VccTx3.3V power supply transmitter230Vcc13.3V power supply231LPModeLow Power Mode, not connect232GNDTransmitter Ground (Common with Receiver Ground)133Tx3pTransmitter Non-Inverted Data Input3434Tx3nTransmitter Inverted Data Output135GNDTransmitter Ground (Common with Receiver Ground)136Tx1pTransmitter Non-Inverted Data Input3737Tx1nTransmitter Inverted Data Output	21	Rx2n	Receiver Inverted Data Output	
24 Rx4n Receiver Inverted Data Output 25 Rx4p Receiver Non-Inverted Data Output 26 GND Transmitter Ground (Common with Receiver Ground) 27 ModPrsl Module Present 28 IntL Interrupt 29 VccTx 3.3V power supply transmitter 20 Vcc1 3.3V power supply 21 LPMode Low Power Mode, not connect 32 GND Transmitter Ground (Common with Receiver Ground) 33 Tx3p Transmitter Non-Inverted Data Input 34 Tx3n Transmitter Inverted Data Output 35 GND Transmitter Ground (Common with Receiver Ground) 36 Tx1p Transmitter Non-Inverted Data Input 37 Tx1n Transmitter Inverted Data Output	22	Rx2p	Receiver Non-Inverted Data Output	
25 Rx4p Receiver Non-Inverted Data Output 26 GND Transmitter Ground (Common with Receiver Ground) 27 ModPrsl Module Present 28 IntL Interrupt 29 VccTx 3.3V power supply transmitter 20 Vcc1 3.3V power supply 21 LPMode Low Power Mode, not connect 32 GND Transmitter Ground (Common with Receiver Ground) 33 Tx3p Transmitter Non-Inverted Data Input 34 Tx3n Transmitter Inverted Data Output 35 GND Transmitter Ground (Common with Receiver Ground) 36 Tx1p Transmitter Non-Inverted Data Input 37 Tx1n Transmitter Inverted Data Output	23	GND	Transmitter Ground (Common with Receiver Ground)	1
26 GND Transmitter Ground (Common with Receiver Ground) 27 ModPrsl Module Present 28 IntL Interrupt 29 VccTx 3.3V power supply transmitter 20 Vcc1 3.3V power supply 21 LPMode Low Power Mode, not connect 32 GND Transmitter Ground (Common with Receiver Ground) 33 Tx3p Transmitter Non-Inverted Data Input 34 Tx3n Transmitter Inverted Data Output 35 GND Transmitter Ground (Common with Receiver Ground) 36 Tx1p Transmitter Non-Inverted Data Input 37 Tx1n Transmitter Inverted Data Output	24	Rx4n	Receiver Inverted Data Output	
27ModPrsIModule Present28IntLInterrupt29VccTx3.3V power supply transmitter230Vcc13.3V power supply231LPModeLow Power Mode, not connect32GNDTransmitter Ground (Common with Receiver Ground)133Tx3pTransmitter Non-Inverted Data Input34Tx3nTransmitter Inverted Data Output35GNDTransmitter Ground (Common with Receiver Ground)136Tx1pTransmitter Non-Inverted Data Input37Tx1nTransmitter Inverted Data Output	25	Rx4p	Receiver Non-Inverted Data Output	
28IntLInterrupt29VccTx3.3V power supply transmitter230Vcc13.3V power supply231LPModeLow Power Mode, not connect32GNDTransmitter Ground (Common with Receiver Ground)133Tx3pTransmitter Non-Inverted Data Input34Tx3nTransmitter Inverted Data Output35GNDTransmitter Ground (Common with Receiver Ground)136Tx1pTransmitter Non-Inverted Data Input37Tx1nTransmitter Inverted Data Output	26	GND	Transmitter Ground (Common with Receiver Ground)	1
29VccTx3.3V power supply transmitter230Vcc13.3V power supply231LPModeLow Power Mode, not connect32GNDTransmitter Ground (Common with Receiver Ground)133Tx3pTransmitter Non-Inverted Data Input34Tx3nTransmitter Inverted Data Output35GNDTransmitter Ground (Common with Receiver Ground)136Tx1pTransmitter Non-Inverted Data Input37Tx1nTransmitter Inverted Data Output	27	ModPrsl	Module Present	
30 Vcc1 3.3V power supply 2 31 LPMode Low Power Mode, not connect 32 GND Transmitter Ground (Common with Receiver Ground) 1 33 Tx3p Transmitter Non-Inverted Data Input 34 Tx3n Transmitter Inverted Data Output 35 GND Transmitter Ground (Common with Receiver Ground) 1 36 Tx1p Transmitter Non-Inverted Data Input 37 Tx1n Transmitter Inverted Data Output	28	IntL	Interrupt	
31 LPMode Low Power Mode, not connect 32 GND Transmitter Ground (Common with Receiver Ground) 1 33 Tx3p Transmitter Non-Inverted Data Input 34 Tx3n Transmitter Inverted Data Output 35 GND Transmitter Ground (Common with Receiver Ground) 1 36 Tx1p Transmitter Non-Inverted Data Input 37 Tx1n Transmitter Inverted Data Output	29	VccTx	3.3V power supply transmitter	2
32 GND Transmitter Ground (Common with Receiver Ground) 1 33 Tx3p Transmitter Non-Inverted Data Input 34 Tx3n Transmitter Inverted Data Output 35 GND Transmitter Ground (Common with Receiver Ground) 1 36 Tx1p Transmitter Non-Inverted Data Input 37 Tx1n Transmitter Inverted Data Output	30	Vcc1	3.3V power supply	2
33 Tx3p Transmitter Non-Inverted Data Input 34 Tx3n Transmitter Inverted Data Output 35 GND Transmitter Ground (Common with Receiver Ground) 1 36 Tx1p Transmitter Non-Inverted Data Input 37 Tx1n Transmitter Inverted Data Output	31	LPMode	Low Power Mode, not connect	
34 Tx3n Transmitter Inverted Data Output 35 GND Transmitter Ground (Common with Receiver Ground) 1 36 Tx1p Transmitter Non-Inverted Data Input 37 Tx1n Transmitter Inverted Data Output	32	GND	Transmitter Ground (Common with Receiver Ground)	1
34 Tx3n Transmitter Inverted Data Output 35 GND Transmitter Ground (Common with Receiver Ground) 1 36 Tx1p Transmitter Non-Inverted Data Input 37 Tx1n Transmitter Inverted Data Output	33	Tx3p	Transmitter Non-Inverted Data Input	
36 Tx1p Transmitter Non-Inverted Data Input 37 Tx1n Transmitter Inverted Data Output	34		Transmitter Inverted Data Output	
37 Tx1n Transmitter Inverted Data Output	35	GND	Transmitter Ground (Common with Receiver Ground)	1
37 Tx1n Transmitter Inverted Data Output	36	Tx1p	Transmitter Non-Inverted Data Input	
· · · · · · · · · · · · · · · · · · ·	37		·	
38 GND Fransmitter Ground (Common with Receiver Ground) 1	38	GND	Transmitter Ground (Common with Receiver Ground)	1

Notes: 1. GND is the symbol for signal and supply (power) common for QSFP28 modules. 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. VccRx, Vcc1 and VccTx are the receiving and transmission power suppliers and shall be applied concurrently. Recommended host board power supply filtering is shown below. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the QSFP28 transceiver module in any combination. The connector pins are each rated for a maximum current of 1000mA.



Memory map

Compatible with SFF-8636

Mechanical Dimensions

Unit: mm

Pull tab color: Gray ,Pantone 424U

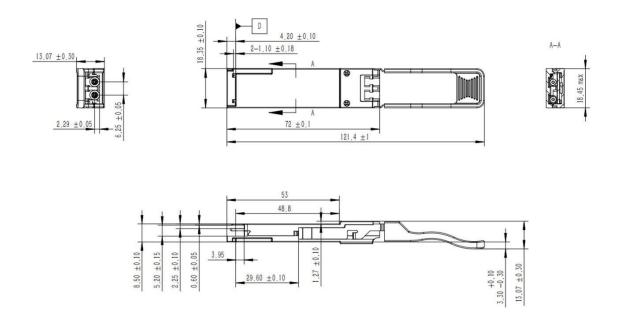


Figure 2. Mechanical dimensions

Order Information

Part Number	Description
LQ-SW100-SR4C	100G QSFP28 SWDM4 Optical Transceiver,0 to +70°C