

CSMQ28HGL3110

100 Gbps QSFP28 Transceiver, Single-Mode, 10 km Reach

Description

The CSMQ28HGL3110 is a 100 Gbps QSFP28 LR4 transceiver module compliant with the QSFP28 MSA and IEEE 802.3ba 100GBASE-LR4 standard. It is designed for use in 100 Gigabit Ethernet links over single-mode fiber (SMF), with transmission distances up to 10 km.

Features

- Hot-pluggable QSFP28 form factor
- Supports 103.1 Gb/s aggregate bit rates
- Maximum link length of 10 km over single-mode fiber (SMF)
- Power dissipation < 3.5 W
- Built-in digital diagnostic functions
- Built-in CDR
- 4 x 25.78 Gb/s DFB-based LAN-WDM transmitter
- Duplex LC receptacles
- Single 3.3 V power supply
- RoHS compliant
- Operating case temperature: 0 °C to +70 °C

Applications

- 100GBASE-LR4 Ethernet

Absolute Maximum Ratings (Tc = 25 °C, Unless Otherwise Noted)

Module performance is not guaranteed beyond the operating range.

Exceeding the limits below may damage the transceiver module permanently.

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Storage Temperature	Ts	-40		+85	°C	
Maximum Supply Voltage	Vcc	-0.3		3.6	V	
Operating Relative Humidity	RH	15		85	%	

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Data Rate	DR	25.78 ± 100 ppm			Gb/s	1
Bit Error Rate at 25.78 Gb/s	BER			1E-12		2
Operating Case Temperature	Tc	0		+70	°C	
Fiber Length on SMF	L			10	km	

Notes:

1. Supports 100GBASE-LR4 per IEEE 802.3ba.
2. Tested with a PRBS 2³¹-1 pattern.

Electrical Specifications

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Supply Voltage	Vcc	3.135		3.465	V	
Supply Current	Icc			1.12	A	
Module Total Power	P			3.5	W	1
Transmitter						
Signaling rate per lane		25.78 ± 100 ppm			Gb/s	
Differential Input Impedance	Zin	100	100		Ohm	
Differential Input Voltage Amplitude	Vin			900	mVp-p	
Receiver						
Signaling rate per lane		25.78 ± 100ppm			Gb/s	
Differential Output Impedance	ZOUT		100		Ohm	
Differential Output Voltage Amplitude	VOUT	400		900	mVp-p	
Eye Width		0.57			UI	
Vertical Eye Closure				5.5	dB	
Transition Time, 20% to 80%	Tr/Tf	12			ps	

Notes:

Maximum total power value is specified across the full temperature and voltage range.

Optical Specifications

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Signaling Rate per Lane		25.78125 ± 100 ppm			Gb/s	1
Center Wavelength	λ	1294.53 – 1296.59 1299.02 – 1301.09 1303.54 – 1305.63 1308.09 – 1310.19			nm	
Side-Mode Suppression Ratio	SMSR	30			dB	
Transmit OMA per Lane	TXP	-1.3		4.5	dBm	
Transmit Average Power per Lane	Pout	-4.3		4.5	dBm	
Optical Extinction Ratio	ER	4			dB	
Average Launch Power of OFF Transmitter, per Lane				30	dBm	
Optical Return Loss Tolerance	RL			20	dB	
Relative Intensity Noise	RIN			-130	dB/Hz	
Transmitter Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3}		{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}				2
Receiver						
Signaling rate per lane		25.78125 ± 100 ppm			Gb/s	1
Center wavelength	λ	1294.53 – 1296.59 1299.02 – 1301.09 1303.54 – 1305.63 1308.09 – 1310.19			nm	
Average Receive Power per Lane	RXP	-10.6		4.5	dBm	
Receive Power (OMA) per Lane	RxOMA			4.5	dBm	
Receiver Reflectance	Rfl			-26	dB	
Receive Sensitivity in OMA, Each Lane	SEN			-8.6	dBm	
LOS De-Assert	LOSD			-11.6	dBm	
LOS Assert	LOSA	-24			dBm	
LOS Hysteresis	LOSh	0.5			dB	

Notes:

1. The transmitter and receiver consist of four lasers and photodiodes operating at 25.78 Gb/s each for 100GBASE-LR4.
2. Hit ratio 5E-5.

Pin Diagram

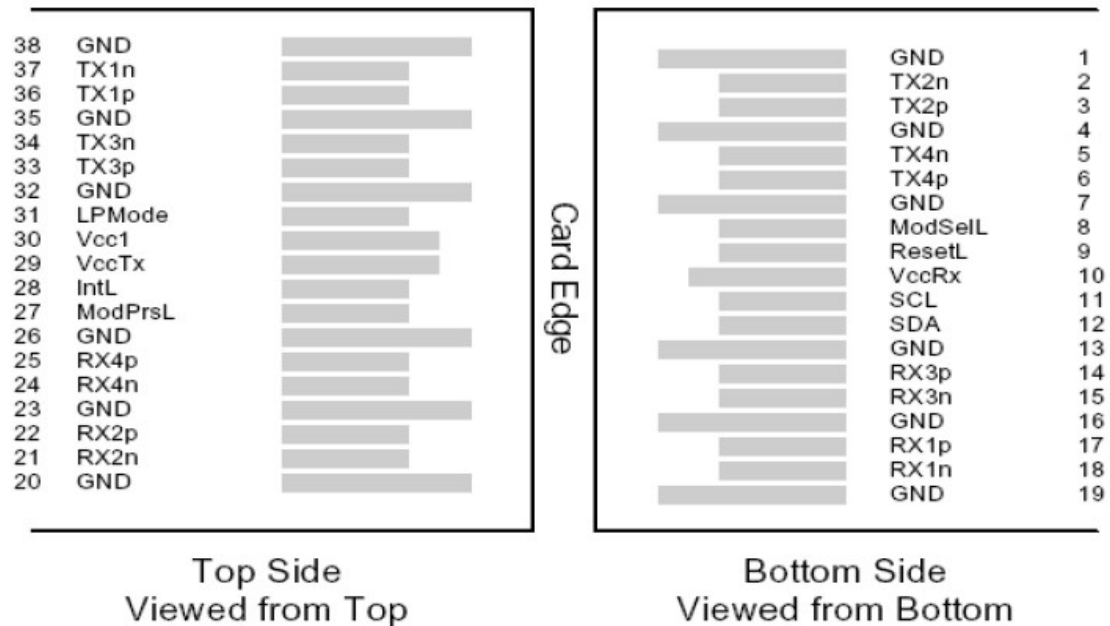


Figure 1 – QSFP28-Compliant 38-Pin Connector (per SFF-8679)

Pin Descriptions

Pin	Symbol	Name/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	1
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	VccRx	+3.3 V Power Supply Receiver	
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	Rx1n	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	1
24	Rx4n	Receiver Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	1
27	ModPrsL	Module Present	
28	IntL	Interrupt	2
29	VccTx	+3.3 V Power Supply Transmitter	
30	Vcc1	+3.3 V Power Supply	
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. Circuit ground is internally isolated from chassis ground.
2. IntL is an open-collector/drain output that should be pulled up with a 4.7 kOhm to 10 kOhm resistor on the host board. The IntL pin is deasserted High after completion of reset when Byte 2, Bit 0 (Data_Not_Ready) is read as 0 and the flag field is read (see SFF-8636).

Digital Diagnostic Functions

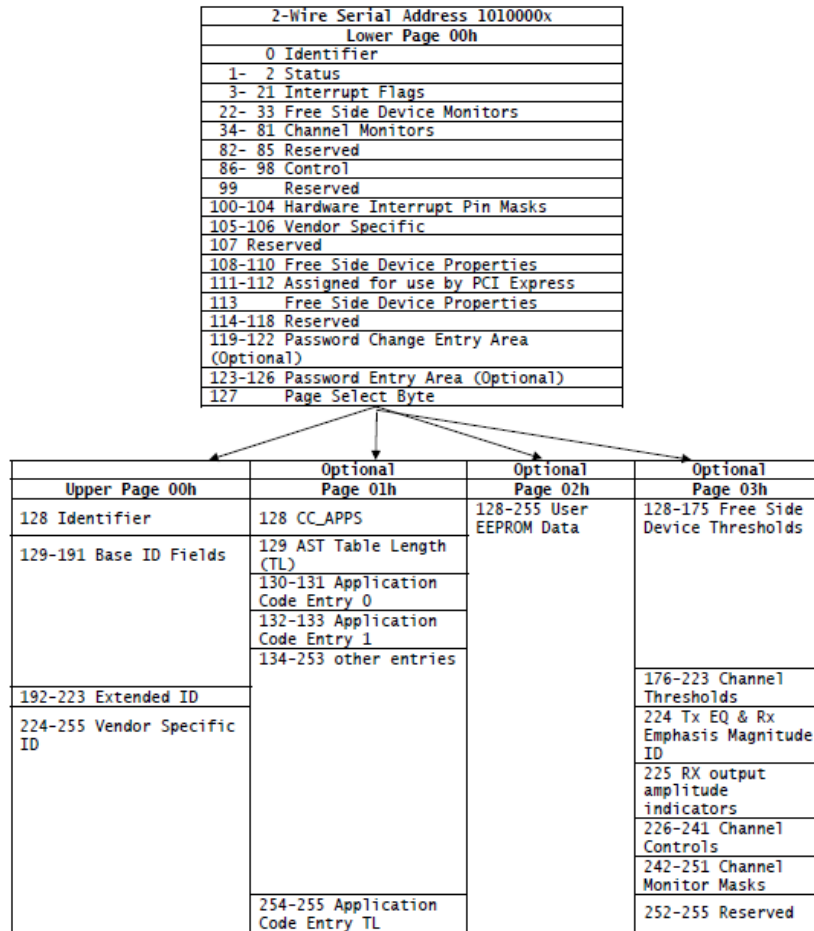


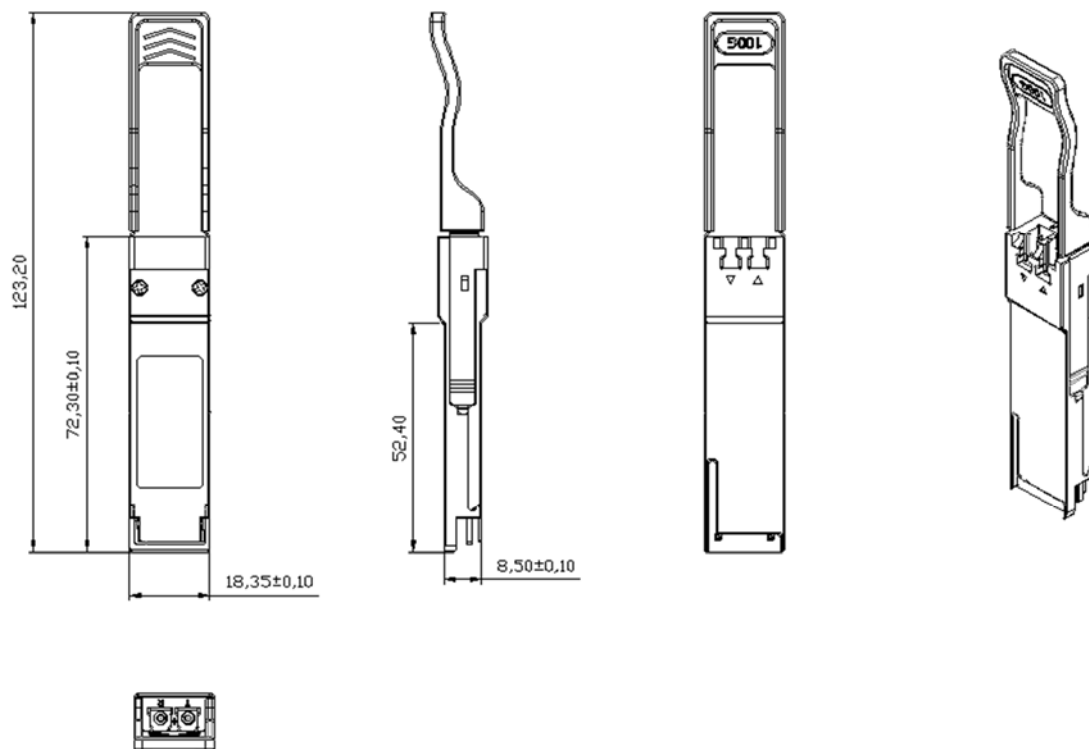
Figure 2 – Two-Wire Interface Fields

The internal Digital Diagnostics Transceiver Controller (DDTC) monitors and reports operating and diagnostic information, which is accessible via a 2-wire serial interface. The 2-wire serial interface consists of a master and a slave. The host side acts as the master, and the module side acts as the slave. Control and data are transferred serially. The master initiates all data transfers, enabling bidirectional communication between the master and slave.

The 2-wire interface consists of the serial clock (SCL) and serial data (SDA) signals. The master uses SCL to clock data and control information on the 2-wire bus. The master and slave latch the state of SDA on the rising edge of SCL. The SDA signal is bidirectional. During data transfer, the SDA signal transitions only when SCL is low. A transition on the SDA signal while SCL is high indicates a start or stop condition.

For more information, please refer to the QSFP28 MSA documentation.

Mechanical Specifications



Unit: mm

Ordering Information

Part Number	Product Description
CSMQ28HGL3110	100 Gbps QSFP28 LAN-WDM4, LC, 10 km, 0 °C to +70 °C, with DDM

For More Information

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