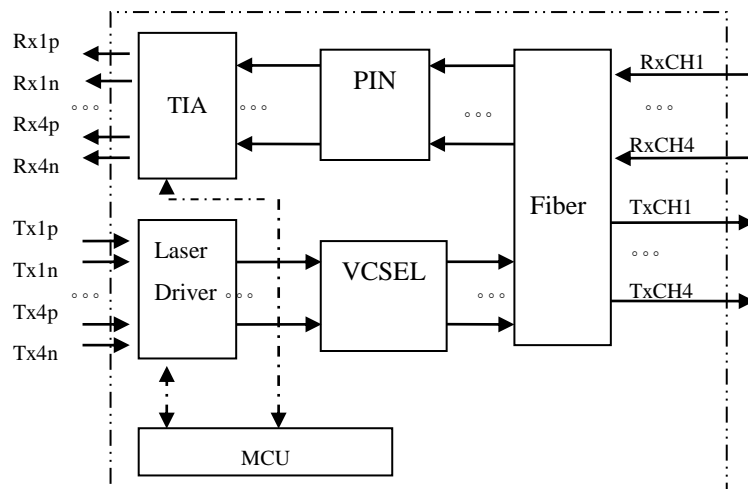


## Features

- Hot-pluggable QSFP28 form factor
- Supports 103.1Gb/s aggregate bit rates
- Power dissipation < 3.5W
- Commercial case temperature range of 0°C to 70°C
- Single +3.3V power supply
- Maximum link length of 100m on OM4 Multimode Fiber (MMF)
- 4x25Gb/s 850nm VCSEL-based transmitter
- 4x25G electrical interface
- Single MPO12 receptacle
- I<sup>2</sup>C management interface

## Application

- IEEE 802.3bm 100GBASE SR4 and 40GBASE SR4128G Fiber Channel
- Infiniband FDR/EDR



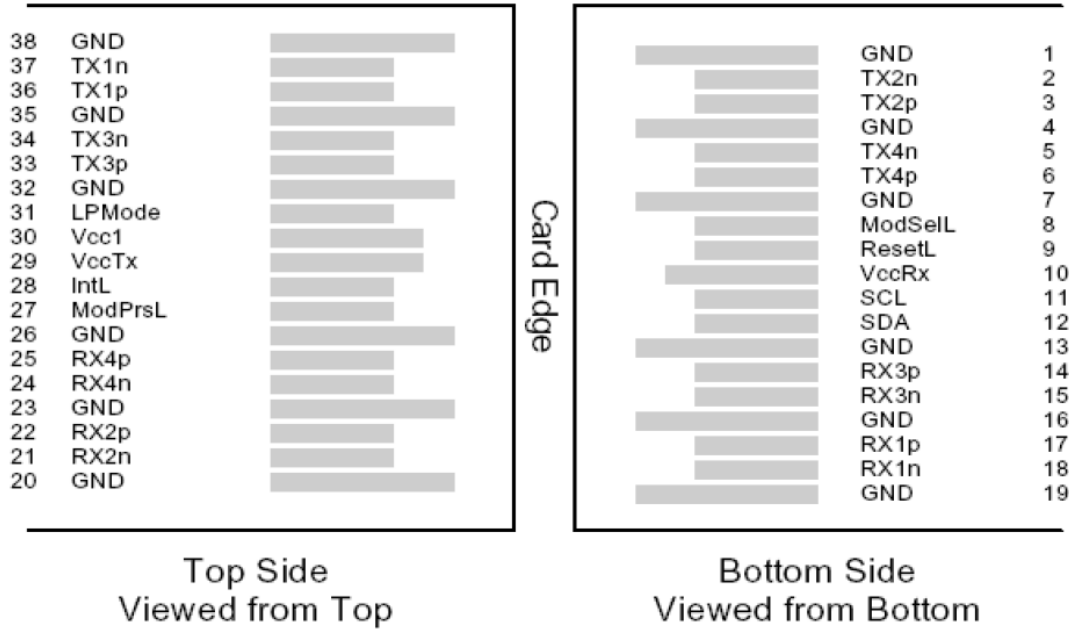
Module Block Diagram

## Ordering Information

HOLS-Q2885M1-MD-CV:

100G QSFP28 850nm 100meter Optical Transceiver.

## Pin Descriptions



Pin	Symbol	Name/Description	Notes
1	GND	Ground	
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	
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	
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	
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Ground	
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	
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	Vcc Tx	+3.3V Power supply transmitter	
30	Vcc1	+3.3V Power supply	
31	LPMoDe	Low Power Mode	
32	GND	Ground	
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	

35	GND	Ground	
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	

Notes

1. Circuit ground is internally isolated from chassis ground.

### Absolute Maximum Ratings

Module performance is not guaranteed beyond the operating range.

Exceeding the limits below may damage the transceiver module permanently.

Form Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Maximum Supply Voltage	V <sub>CC</sub>	-0.3		3.6	V	
Storage Temperature	T <sub>S</sub>	-20		85	°C	
Case Operating Temperature	T <sub>OP</sub>	0		70	°C	
Relative Humidity	RH	1.5		85	%	1
Receiver Damage Threshold, per Lane	P <sub>Rdmg</sub>	5.5			dBm	

Notes:

1. Non-condensing.

### Recommended Operating Conditions

Form Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Supply Voltage	V <sub>CC</sub>	3.13	3.3	3.47	V	
Operating Case temperature	T <sub>ca</sub>	0		70	°C	
Data Rate Per Lane	f <sub>d</sub>		25.78125		Gbps	
Humidity	Rh	5		85	%	
Fiber Bend Radius	R <sub>b</sub>	3			cm	

### Electrical Characteristics(EOL, T<sub>OP</sub> = 0 to 70° C, V<sub>CC</sub> = 3.135 to 3.465 Volts)

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Supply Voltage	V <sub>CC</sub>	3.135		3.465	V	
Supply Current	I <sub>CC</sub>			1.5	A	
Module total power	P			3.5	W	1
<b>Transmitter</b>						
Signaling rate per lane			25.78		Gb/s	2
Differential data input voltage per lane	V <sub>in,pp,diff</sub>			900	mV	
Single-ended voltage tolerance	V <sub>in,pp</sub>	-0.35		+3.3	V	
<b>Receiver</b>						
Signaling rate per lane			25.78		Gb/s	2
Differential data output swing	V <sub>out,pp</sub>	400	600	800	mV <sub>pp</sub>	
Transition time (20% to 80%)	T <sub>r</sub> , T <sub>f</sub>	12			ps	
Bit Error Rate	BER			E-12		3

Notes:

1. Maximum total power value is specified across the full operational temperature and voltage range when CDRs are locked or a lack of input signal results in squelch being activated. If incorrect frequencies cause the CDRs to continuously attempt to lock, maximum power dissipation may reach 4.5 W.
2. ± 100ppm
3. BER=10<sup>-12</sup>; PRBS [2<sup>31</sup>-1@25.78125Gbps](#).

### Optical Characteristics(EOL, T<sub>OP</sub> = 0 to 70° C, V<sub>CC</sub> = 3.135 to 3.465 Volts)

Optical characteristics are dependent on data rate and protocol. Ethernet 100GBASE-SR4, OTU4, and 128G Fibre Channel optical characteristics are as follows:

#### 100GBASE-SR4 Ethernet Operation

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
<b>Transmitter</b>						
Signaling Speed per Lane		25.78125 ± 100ppm			Gb/s	1
Center wavelength		840		860	nm	
RMS Spectral Width	SW			0.6	nm	
Average Launch Power per Lane	TXP <sub>x</sub>	-8.4		2.4	dBm	
Transmit OMA per Lane	TxOMA	-6.4		3	dBm	
Launch Power [OMA] minus TDEC per Lane	P-TDEC	-7.3			dBm	
TDEC per Lane	TDEC			4.3	dBm	
Optical Extinction Ratio	ER	2			dB	
<b>Receiver</b>						
Signaling Speed per Lane		25.78125 ± 100ppm			GBd	2
Center wavelength		840		860	nm	
Average Receive Power per Lane	RXP <sub>x</sub>	-10.3		2.4	dBm	3
Receiver Reflectance	Rfl			-12	dB	
Stressed Receiver Sensitivity (OMA) per Lane	SRS			-5.2	dBm	
<b>Stressed Conditions:</b>						
LOS De-Assert	LOS <sub>D</sub>			-12	dBm	
LOS Assert	LOS <sub>A</sub>	-30			dBm	
LOS Hysteresis		0.5	2		dB	

Notes:

1. Transmitter consists of 4 lasers operating at a maximum speed of 25.78125Gb/s ±100ppm each.
2. Receiver consists of 4 photodetectors operating at a maximum speed of 25.78125Gb/s ±100ppm each.
3. Minimum value is informative only and not the principal indicator of signal strength.

#### General Specifications

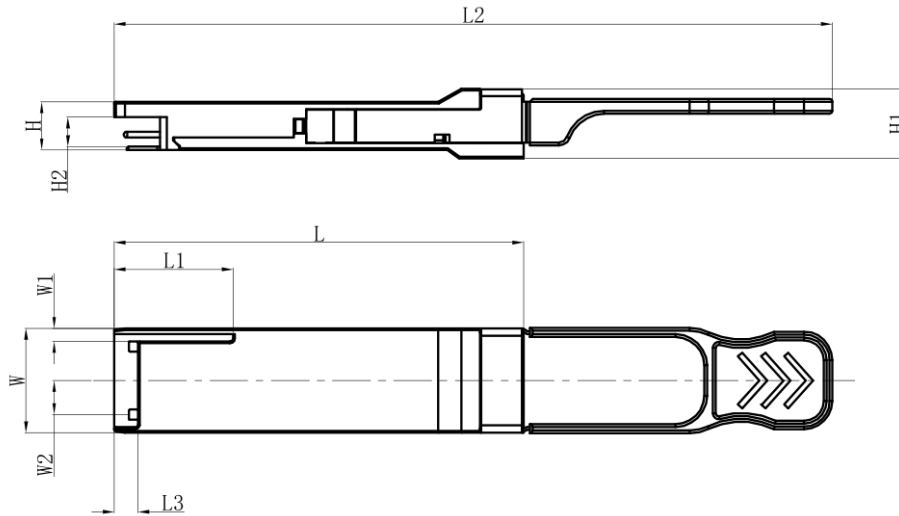
Form Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Bit Rate (all wavelengths combined)	BR			112.2	Gb/s	1
Bit Error Ratio @25.78Gb/s	BER1			5x10 <sup>-5</sup>		2
<b>Maximum Supported Distances</b>						
Fiber Type						
OM3 MMF	Lmax1			70	m	3
OM4 MMF	Lmax2			100	m	3

Notes:

1. Supports 100GBASE-SR4 per IEEE 802.3bm.
2. Tested with a 2<sup>31</sup> – 1 PRBS.
3. Requires FEC on the host to support maximum distance.

### Mechanical Design Diagram (mm)

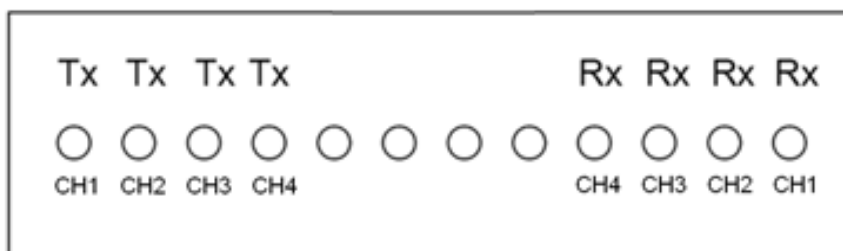
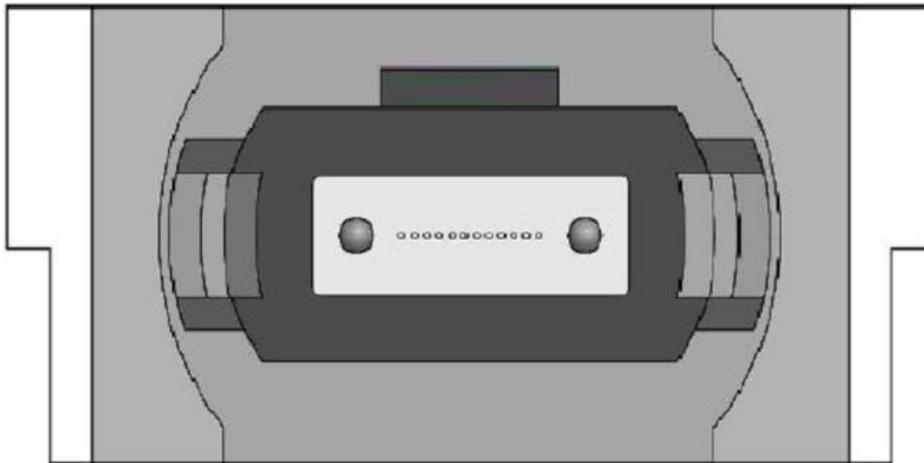
QSFP28 transceivers are compatible with the QSFP28 MSA specification.



Unit: mm

	L	L1	L2	L3	W	W1	W2	H	H1	H2
MAX	72.2	—	128	4.35	18.45	—	6.2	8.6	12.0	5.35
Typical	72.0	—	—	4.20	18.35	—	—	8.5	11.8	5.2
MIN	68.8	16.5	124	4.05	18.25	2.2	5.8	8.4	11.6	5.05

### Optical Interface



## Warnings

**Handling Precautions:** This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

**Laser Safety:** Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.