CL-Q28-ZR-80-1277
QSFP 28 100 Gb/s BIDI ER 80 km DDM Transceiver
RoHS 6 compliant

Features



- Up to 80km reach for G.652 SMF
- Cooled 4x25Gb/s LAN WDM Blue or Red Side TOSA, LAN WDM Red or Blue Side ROSA
- 4x25G Electrical Interface
- Single +3.3V power supply
- DDM function implemented
- 2 Wire Serial Interface for module management
- Maximum power dissipation < 5.5W
- Operating temperature range: 0°C ~ 70°C
- Compliant with RoHS6

Applications

- 100GBASE-ZR4 Ethernet
- 100G Datacom& Telecom connections
- 100G 4WDM-40

PART NUMBER	Monitor	INPUT/OUTPUT	SIGNAL DETECT	TEMPERATURE
CL-Q28-ZR-80-1277	X	AC/AC	TTL	0°C to 70 °C

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I. Absolute Maximum Ratings

Parameter	Symbol	Unit	Min	Max
Storage Temperature Range	Ts	°C	-40	85
Relative Humidity	RH	%	0	95
Maximum Supply Voltage	Vcc3	V	-0.5	4.0

II. Recommended Operating Conditions

Parameter	Symbol	Unit	Min	Typ	Max
Operating Case Temperature Range	Tc	°C	0		70
Power Supply Voltage	Vcc	V	3.14	3.3	3.46
Bit Rate	BR	Gb/s			103.1
Bit Error Ratio	BER				5E-5
Max Supported Link Length	L	Km			80

I. Optical and Characteristics *(Tc=0 oC to 70 oC and Vcc= 3.14 to 3.46)*

Parameter	Symbol	Unit	Min	Typ	Max	Notes
Transmitter(per Lane)						
Signaling Speed per Lane		GBd	25.78125 ± 100 ppm			
Blue Side Four Lane Wavelength Range	λ1	nm	1272.55	1273.55	1274.54	
	λ2		1276.89	1277.89	1278.89	
	λ3		1281.25	1282.26	1283.27	
	λ4		1285.65	1286.66	1287.68	
Red Side Four Lane Wavelength Range	λ5	nm	1294.53	1295.56	1296.59	
	λ6		1299.02	1300.05	1301.09	
	λ7		1303.54	1304.58	1305.63	
	λ8		1308.09	1309.14	1310.19	
Total Average Launch Power	Pout	dBm	7		13	1
Average Launch Power per Lane	TXPx	dBm	2		7	1
Optical Extinction Ratio	ER	dB	6			2
Side-Mode Suppression Ratio (SMSR)	SMSR	dB	30			
Average launch power of OFF transmitter, per lane		dBm			-30	
Relative Intensity Noise	RIN	dB/Hz			-130	
Optical Return Loss Tolerance		dB			20	
Transmitter Reflectance		dB			-12	
Transmitter Eye mask definition {X1,X2,X3, Y1,Y2,Y3}			{0.25,0.4,0.45,0.25,0.28,0.4}			

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Receiver(per Lane)						
Signaling Speed per Lane		GBd	25.78125 ± 100 ppm			
Red Side Four Lane Wavelength Range	λ5	nm	1294.53	1295.56	1296.59	
	λ6		1299.02	1300.05	1301.09	
	λ7		1303.54	1304.58	1305.63	
	λ8		1308.09	1309.14	1310.19	
Blue Side Four Lane Wavelength Range	λ1	nm	1272.55	1273.55	1274.54	
	λ2		1276.89	1277.89	1278.89	
	λ3		1281.25	1282.26	1283.27	
	λ4		1285.65	1286.66	1287.68	
Average Receiver Sensitivity per Lane	Rxsens	dBm			-27	3
Average Received Power per Lane	RXPx	dBm	-27		-6	
Damage Threshold Per Lane	Pmax	dBm	5.5			
Return Loss	RL				-26	
LOS De-Assert	LOSD	dBm			-28	
LOS Assert	LOSA	dBm	-40			
LOS Hysteresis		dB	0.5			

Note:

1. The optical power is launched into SMF.
2. Measured with a PRBS 2^{31}-1 test pattern @25.78125, Hit ratio≤5E-5.
3. Measured with a PRBS 2^{31}-1 test pattern @25.78125 Gb/s, BER≤5E-5

III. Electrical Characteristics

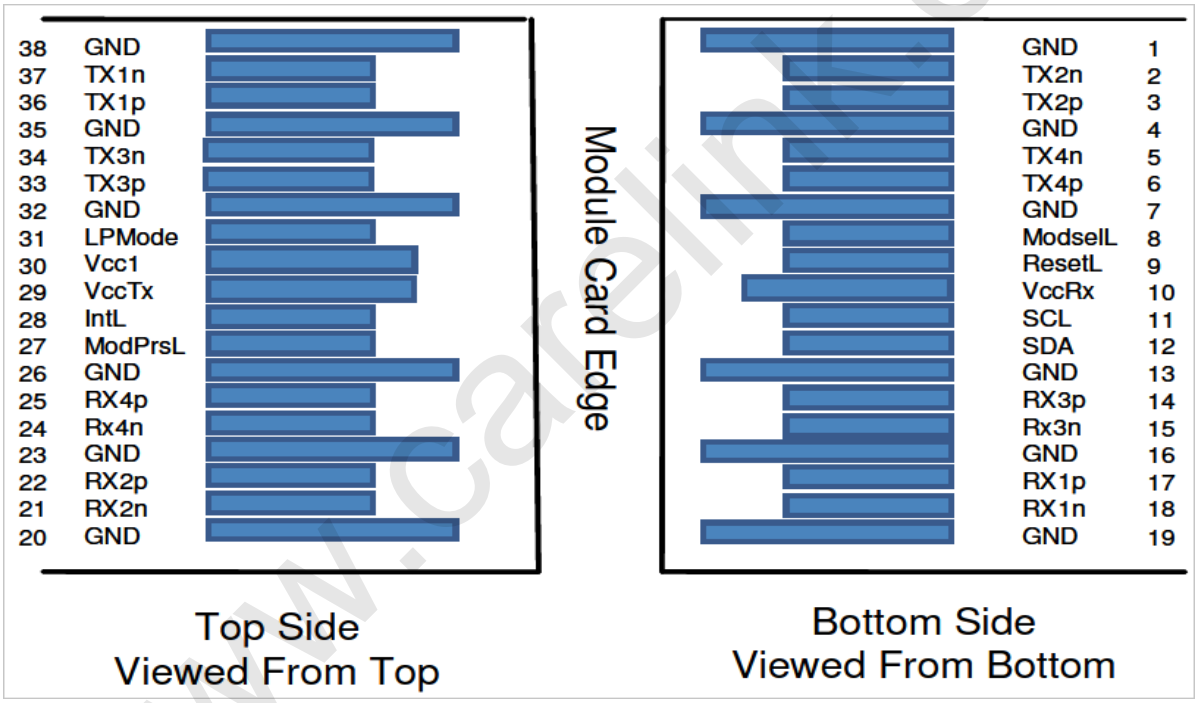
Parameter	Symbol	Unit	Min	Typ	Max	Note
Supply Voltage	V_{CC}	V	3.14	3.3	3.46	
Module Power dissipation		mW			5500	
Transmitter						
Input Differential Impedance	R_{IN}	Ω	90	100	110	
Differential Data Input	VIN	mVp-p	35		900	
Differential input return loss (min)	RLd	dB	IEEE 802.3ba, Section 83E-5			
Differential to common mode input return loss (min)	RLdc	dB	IEEE 802.3ba, Section 83E-6			
Receiver						
Differential Data Output	VOD	mVp-p			900	
AC common mode output voltage (RMS)		mV			17.5	
Differential output return loss (min)		dB	IEEE 802.3ba, Section 83E-2			
Common to differential mode conversion return loss (min)		dB	IEEE 802.3ba, Section 83E-3			
Output transition time,20% to80%		ps	12			
Vertical eye closure		dB			5.5	

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IV. Digital Diagnostics

Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70	°C	±3°C	Internal / External
Voltage	3.0 to 3.6	V	±3%	Internal / External
Bias Current	30 to 100	mA	±10%	Internal / External
TX Power	2 to 6.5	dbm	±3db	Internal / External
RX Power	-29 to -6	dbm	±3db	Internal / External

V. Pin Diagram



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VI. Pin Definitions

Pin	Name	Description	Plug Sequence	Notes
1	GND	Ground	1	
2	Tx2n	Transmitter Inverted Data Input	3	
3	Tx2p	Transmitter Non-Inverted Data Input	3	
4	GND	Ground	1	
5	Tx4n	Transmitter Inverted Data Input	3	
6	Tx4p	Transmitter Non-Inverted Data Input	3	
7	GND	Ground	1	
8	ModSelL	Module Select	3	
9	ResetL	Module Reset	3	
10	Vcc Rx	+3.3 V Power supply receiver	2	
11	SCL	2-wire serial interface clock	3	
12	SDA	2-wire serial interface data	3	
13	GND	Ground	1	
14	Rx3p	Receiver Non-Inverted Data Output	3	
15	Rx3n	Receiver Inverted Data Output	3	
16	GND	Ground	1	
17	Rx1p	Receiver Non-Inverted Data Output	3	
18	Rx1n	Receiver Inverted Data Output	3	
19	GND	Ground	1	
20	GND	Ground	1	
21	Rx2n	Receiver Inverted Data Output	3	
22	Rx2p	Receiver Non-Inverted Data Output	3	
23	GND	Ground	1	
24	Rx4n	Receiver Inverted Data Output	3	
25	Rx4p	Receiver Non-Inverted Data Output	3	
26	GND	Ground	1	
27	ModPrsL	Module Present	3	
28	IntL	Interrupt	3	
29	Vcc Tx	+3.3 V Power supply transmitter	2	
30	Vcc1	+3.3 V Power Supply	2	
31	LPMode	Low Power Mode	3	
32	GND	Ground	1	
33	Tx3p	Transmitter Non-Inverted Data Input	3	
34	Tx3n	Transmitter Inverted Data Input	3	
35	GND	Ground	1	
36	Tx1p	Transmitter Non-Inverted Data Input	3	
37	Tx1n	Transmitter Inverted Data Input	3	
38	GND	Ground	1	

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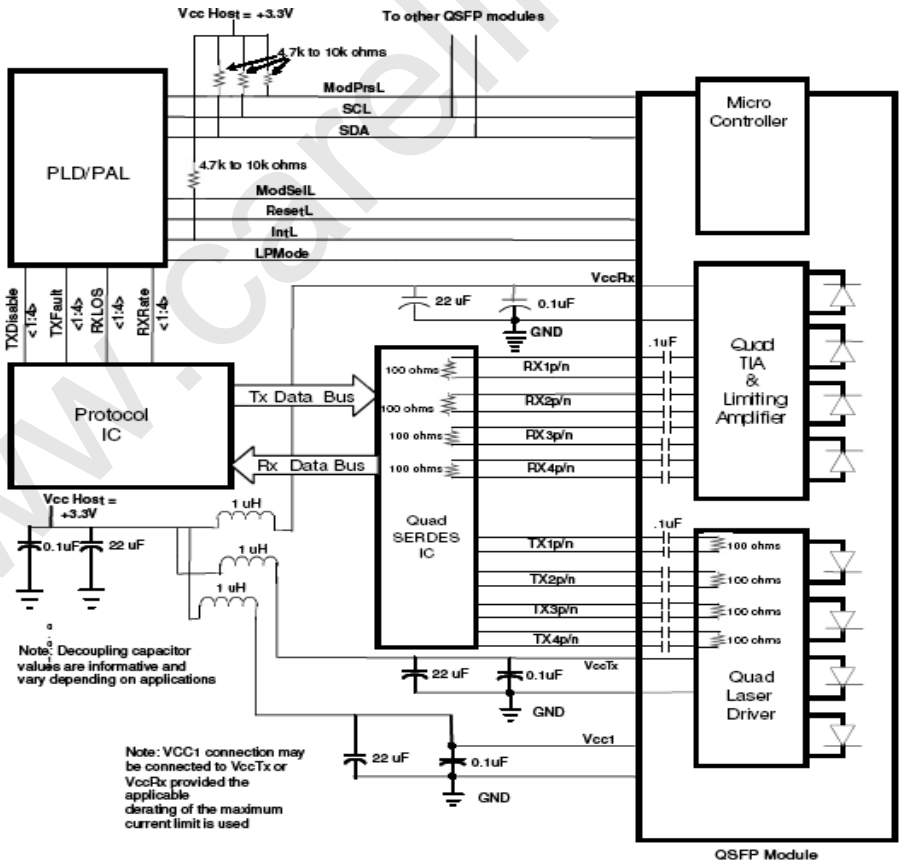
VII. Digital Diagnostics Functions

As defined by the SFF-8665 Specification for QSFP28 Copper and Optical Transceiver,Our QSFP28 transceivers provide digital diagnostic functions via a 2-wire serial interface, which allows real-time access to the following operating parameters:

- Transceiver temperature
- Laser bias current
- Transmitted optical power
- Received optical power
- Transceiver supply voltage

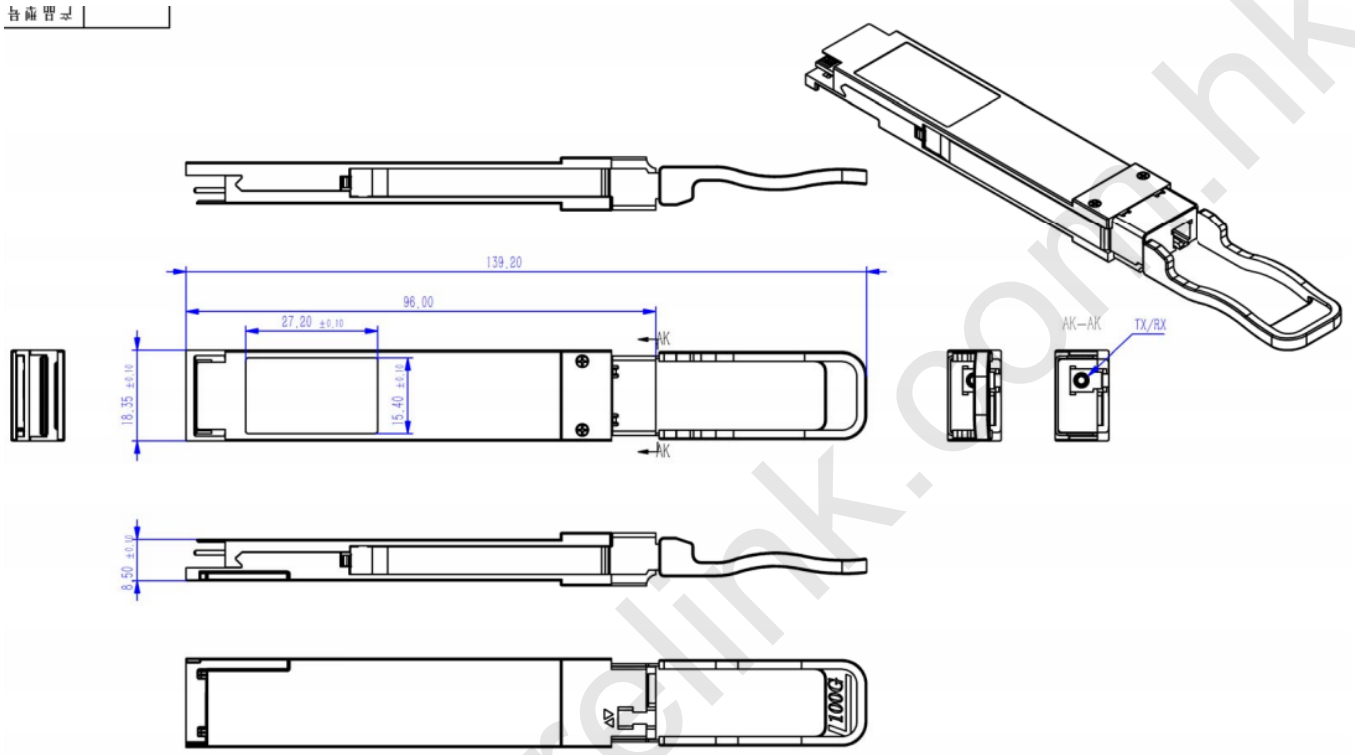
It also provides a sophisticated system of alarm and warning flags, which may be used to alert end-users when particular operating parameters are outside of a factory-set normal range. The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through the 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL pin) is generated by the host.

VIII. Typical Application Circuit



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IX. Mechanical Diagram



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