CL-Q28-SR-150m-850
100G QSFP28 BIDI SR 100m DDM Optical Transceiver Module
RoHS 6 compliant



Features

- QSFP28 MSA compliant
- Support 100GE aggregate bitrates
- Support KP4 FEC @ 100G data rate
- Two independent full-duplex channels
- Up to 100m OM4 MMF transmission
- Operating case temperature: 0 to 70°C
- Single 3.3V power supply
- Maximum power consumption 4W
- LC optical connector
- RoHS-6 compliant

Applications

- Data Center
- Infiniband HDR
- 100G Ethernet

PART NUMBER	Monitor	INPUT/OUTPUT	SIGNAL DETECT	TEMPERATURE
CL-Q28-SR-150m-850	X	AC/AC	TTL	0°C to 70 °C

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Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Units	Note
Storage Temperature	T_S	-40	85	°C	
Operating Case Temperature	T_{OP}	0	70	°C	
Power Supply Voltage	V_{CC}	-0.5	3.6	V	
Relative Humidity (non- condensation)	RH	0	85	%	
Damage Threshold	THd	5		dBm	

Recommended Operating Conditions

Parameter		Symbol	Min	Typical	Max	Units	Notes
Operating Case Temperature		T_{OP}	0		70	°C	
Power Supply Voltage		Vcc	3.135	3.3	3.465	V	
Data Rate Accuracy			- 100		100	ppm	
Pre-FEC Bit Error Ratio					$2.4x10^{-4}$		
Post-FEC Bit Error Ratio					$1x10^{-12}$		1
Control Input Voltage High			2		Vcc	V	
Control Input Voltage Low			0		0.8	V	
Link Distance	OM3	D1			70	m	2
	OM4	D2			100	m	2
	OM5	D3			150	m	2

Notes:

1. FEC provided by host system .
2. FEC required on host system to support maximum distance .

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Optical and Characteristics

Parameter	Symbol	KP4 FEC Mode			Unit	Notes
		Min	Typical	Max		
Center Wavelength Line0	λ_C	844		863	nm	
Center Wavelength Line1	λ_C	900		918	nm	
RMS Spectral Width	$\Delta\lambda_{rms}$			λ1: 0.6 λ2: 0.65	nm	
Average Launch Power, each Lane	P_{AVG}	-6.2		4	dBm	
Optical Modulation Amplitude (OMA), each Lane	P_{OMA}	-4.2		3	dBm	1
Peak Power, each lane				--	dBm	
Launch power in OMA minus TDP, each lane		-5.6			dBm	
TDECQ, each lane				4.5	dB	
Extinction Ratio	ER	3.0			dB	
Transmitter transition time, each lane (max)				31	ps	
RIN12 OMA				- 128	dB/Hz	
Optical Return Loss Tolerance	TOL			12	dB	
Average Launch	Poff			-30	dBm	
Power OFF Transmitter, each Lane						
Encircled Flux		≥ 86% at 19 μm ≤ 30% at 4.5 μm				2
Signaling rate, each lane		26.5625± 100ppm			Gbps	
Center Wavelength Lane0	λ_C	844	850	863	nm	
Center Wavelength Lane1	λ_C	900	910	918	nm	

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Damage Threshold, each Lane	TH_d	5			dBm	3
Average Receive Power, each lane		-8.2			dBm	4
Average power at receiver input, each lane (overload)				4	dBm	
Receiver Reflectance	R_R			- 12	dB	
Stressed receiver sensitivity in OMA, Lane2				-3.5	dBm	5
Receiver sensitivity(OMA outer), each lane				Max (-6.6, SECQ – 8) as per IEEE cl 150	dBm	
LOS Assert	LOSA	-30		- 14.2	dBm	
LOS Deassert	LOSD			- 11.2	dBm	
LOS Hysteresis	LOSH	0.5			dB	

Notes:

1. Even if the mTDEC<0.9 dB, the OMA (min) must exceed this value .
2. If measured into type A1a.2 50um fiber in accordance with IEC 61280-1-4 .
3. The receiver shall be able to tolerate, without damage, continuous exposure to a modulated optical input signal having this power level on one lane. The receiver does not have to operate correctly at this input power.
4. Average receive power, each lane (min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant; however, a value above this does not ensure compliance.
5. Measured with conformance test signal at TP3 as per following:

Stressed eye closure (SECq), each lane	4.5	dB
OMA of each aggressor, each lane	3	dBm

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Electrical Characteristics

Parameter	Test Point	Min	Typical	Max	Units	Notes
Power Consumption				4	W	
Supply Current	Icc			1.21	A	
Transmitter (each Lane)						
Overload Differential Voltage pk-pk	TP1a	900			mV	
Common Mode Voltage (Vcm)	TP1	-350		2850	mV	1
Differential Termination Resistance Mismatch	TP1			10	%	At 1MHz
Differential Return Loss (SDD11)	TP1			See CEI-28G-VSR Equation	dB	
				13- 19		
Common Mode to Differential conversion and Differential to Common Mode conversion (SDC11, SCD11)	TP1			See CEI-28G-VSR Equation 13-20	dB	
Stressed Input Test	TP1a	See CEI-28G-VSR Section 13.3.11.2.1				
Receiver (each Lane)						
Differential Voltage, pk-pk	TP4			900	mV	
Common Mode Voltage (Vcm)	TP4	-350		2850	mV	1
Common Mode Noise, RMS	TP4			17.5	mV	

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Differential Termination Resistance Mismatch	TP4			10	%	At 1MHz
Differential Return Loss (SDD22)	TP4			See CEI-28G-VSR Equation 13- 19	dB	
Common Mode to Differential conversion and Differential to Common Mode conversion (SDC22, SCD22)	TP4			See CEI-28G-VSR Equation 13-21	dB	
Common Mode Return Loss (SCC22)	TP4			-2	dB	2
Transition Time, 20 to 80%	TP4	9.5			ps	
Vertical Eye Closure (VEC)	TP4			5.5	dB	
Eye Width at 10^{-15} probability (EW15)	TP4	0.57			UI	
Eye Height at 10^{-15} probability (EH15)	TP4	228			mV	

1. Vcm is generated by the host. Specification includes effects of ground offset voltage.
2. From 250MHz to 30GHz.

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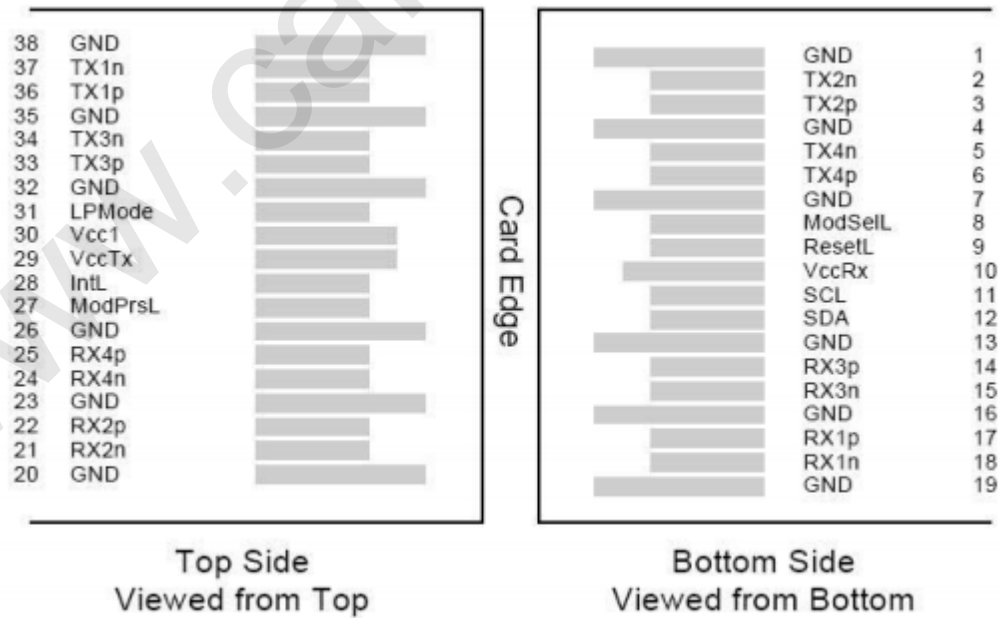
Digital Diagnostics

Parameter	Symbol	Min	Max	Units	Notes
Temperature monitor absolute error	DMI_Temp	-3	3	°C	Over operating temperature range
Supply voltage monitor absolute error	DMI _VCC	-0.15	0.15	V	Over full operating range
Channel RX power monitor absolute error	DMI_RX_Ch	-2	2	dB	1
Channel Bias current monitor	DMI_Ibias_Ch	- 10%	10%	mA	Ch1~Ch4
Channel TX power monitor absolute error	DMI_TX_Ch	-2	2	dB	1

Notes:

1. Due to measurement accuracy of different single mode fibers, there could be an additional +/- 1 dB fluctuation, or a +/- 3 dB total accuracy.

Pin Diagram



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Pin Definitions

PIN	Logic	Symbol	Name/Description	Notes
1		GND	Ground	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-Inverted Data output	
4		GND	Ground	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	
6	CML-I	Tx4p	Transmitter Non-Inverted Data output	
7		GND	Ground	1
8	LVTLL-I	ModSelL	Module Select	
9	LVTLL-I	ResetL	Module Reset	
10		VccRx	+3.3V Power Supply Receiver	2
11	LVCMOS-I/O	SCL	2-Wire Serial Interface Clock	
12	LVCMOS-I/O	SDA	2-Wire Serial Interface Data	
13		GND	Ground	
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	
15	CML-O	Rx3n	Receiver Inverted Data Output	
16		GND	Ground	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	
18	CML-O	Rx1n	Receiver Inverted Data Output	
19		GND	Ground	1
20		GND	Ground	1
21	CML-O	Rx2n	Receiver Inverted Data Output	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	
23		GND	Ground	1

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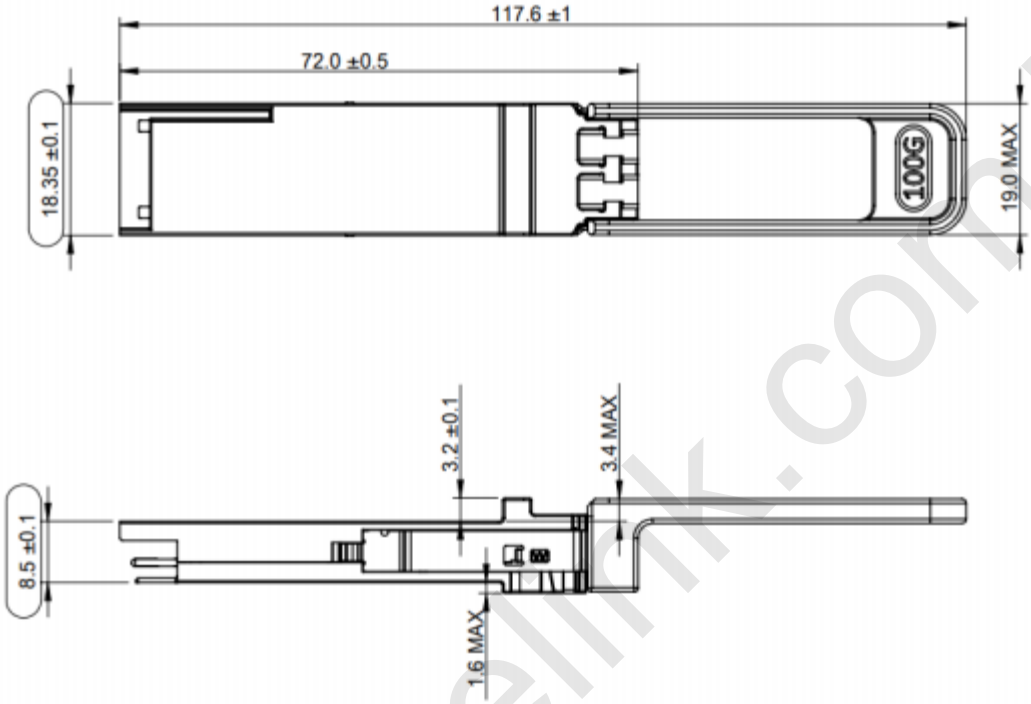
24	CML-O	Rx4n	Receiver Inverted Data Output	1
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	
26		GND	Ground	1
27	LVTTL-O	ModPrsL	Module Present	
28	LVTTL-O	IntL	Interrupt	
29		VccTx	+3.3 V Power Supply transmitter	2
30		Vcc1	+3.3 V Power Supply	2
31	LVTTL-I	LPMode	Low Power Mode	
32		GND	Ground	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	
34	CML-I	Tx3n	Transmitter Inverted Data Output	
35		GND	Ground	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	
37	CML-I	Tx1n	Transmitter Inverted Data Output	
38		GND	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 receiver and transmitter power suppliers and shall be applied concurrently. Recommended host board power supply filtering is shown in Figure 4 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.

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Mechanical Diagram



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