

QSFP-100G-BXD40

100G BIDI QSFP28 4-WDM Tx 1310, Rx 1280nm 40km LC SMF

Features

- Hot pluggable QSFP28 MSA form factor
- Supports 103.1Gb/s aggregate bit rate
- Up to 40km reach for G.652 SMF [with RS(528,514) FEC]
- Single +3.3V power supply
- Extended case temperature range of -20 to 85°C
- Cooled 4x25Gb/s LAN WDM Blue or Red Side TOSA, LAN WDM Red or Blue Side ROSA
- Maximum power consumption 5.5W
- Single LC receptacle
- Compliant with the QSFP28 and 4WDM-40 MSA
- Compatible with RoHS2.0
- DDM function

Applications

- Ethernet Links
- 100G 4WDM-40 Applications with FEC

Absolute Maximum Ratings

Table 1 - Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Units
Transportation and Storage Temperature Range	Ts	°C	-40	+85
Transportation and Storage Relative Humidity	RH	%	5	95
Power Supply Voltage	Vcc	V	-0.3	+3.6
Case Temperature Range when module is powered on Ready State	Tc	°C	-20	85
Mean Receiver Damage Threshold Per Lane	Pdag	dBm		-2.5
ESD(HBM)		V		1000

Recommended Operating Conditions

Table 2- Recommended Operating Conditions

Parameter	Symbol	Unit	Min	Typ	Max
Operating Case Temperature Range	Tc	°C	-20		85
Relative Humidity	RH	%	0		90
Power Supply Voltage	Vcc	V	3.135	3.3	3.465
Total Power Consumption	Pw	W			5.5
Data rate(each line)		Gb/s		25.78125	-

Electrical Characteristics

Table 3-Voltage Supply Electrical Characteristics

Parameter	Symbol	Unit	Min	Typ	Max	Notes
Steady State Supply Current	Icc	mA	-	-	1587	
Sustained peak current	ISP	mA			1815	
Instantaneous peak current	IIP	mA			2200	
Power Dissipation	Pw	W			5.5	
Low Power Dissipation	Plow	W			1.5	

Table 4-Different Signal Electrical Characteristics

Parameter	Symbol	Unit	Min	Typ	Max	Notes
Pattern		PRBS9				
Transmitter Electrical Input from Host at TP1a (detailed specification in CEI-28G-VSR)						
Differential voltage pk-pk		mV		-	900	
Common mode noise (rms)		mV			17.5	
Eye height		mV	95			
Eye width		Ui	0.46			
Differential termination mismatch		%			10	
Transition time		ps	10			20/80%

Common mode voltage		V	-0.3		2.8	
Receiver Electrical Output to Host at TP4 (detailed specification in CEI-28G-VSR)						
Differential voltage pk-pk		mV		-	900	
Common mode noise (rms)		mV			17.5	
Eye height		mV	228			
Eye width		Ui	0.57			
Differential termination mismatch		%			10	
Transition time		ps	9.5			20/80%
Vertical eye closure	VEC	dB			5.5	

Table 5- 3.3V LVTTTL Electrical Characteristics

Parameter	Symbol	Unit	Min	Typ	Max	Notes
Input High Voltage	VIH	V	2.0	-	Vcc+0.3	
Input Low Voltage	VIL	V	-0.3	-	0.8	
Input Leakage Current	IIN	uA	-10	-	+10	
Output High Voltage (IOH=100uA)	VOH	V	Vcc-0.5	-	Vcc+0.3	
Output Low Voltage (IOL=100uA)	VOL	V	0		0.4	

Table 6- 3.3V LVCMOS Electrical Characteristics

Parameter	Symbol	Unit	Min	Typ	Max	Notes
Input High Voltage	VIH	V	Vcc*0.7	-	Vcc+0.5	
Input Low Voltage	VIL	V	-0.3	-	Vcc*0.3	
Output High Voltage (IOH=100uA)	VOH	V	Vcc-0.5	-	Vcc+0.3	
Output Low Voltage (IOL=100uA)	VOL	V	0		0.4	
I/O PIN Capacitance	Ci	pF			14	

Optic Specification

Table 7-Optical Specifications for 4*25G (4WDM-40 Bidi)

Parameter	Symbol	Unit	Min	Typ	Max	Note
Optical transmitter Characteristics						
Signaling Rate for Each Lane		Gbps	-	25.78125		
Signaling Speed Accuracy		ppm	-100		+100	
Blue Side Four Lane Wavelength Range	λ_1	nm	1272.55	1273.55	1274.54	
	λ_2		1276.89	1277.89	1278.89	
	λ_3		1281.25	1282.26	1283.27	
	λ_4		1285.65	1286.66	1287.68	
Red Side Four Lane Wavelength Range	λ_5	nm	1294.53	1295.56	1296.59	
	λ_6		1299.02	1300.05	1301.09	
	λ_7		1303.54	1304.58	1305.63	
	λ_8		1308.09	1309.14	1310.19	
Side Mode Suppression Ratio (min)	SMSR		30			
Total Average Launch Power	Pt	dBm	-		12.5	
Average Launch Power for Each Lane	Pa	dBm	-2.5 ¹		6.5	
Optical Modulation Amplitude for Each Lane	OMA	dB	0.5 ²		6.5	
Launch power in OMA minus TDP, per Lane(min)		dB	-0.5			
Difference in launch power between any two lanes(OMA) (max)		dB			4.0	
Transmitter and Dispersion Penalty for Each Lanes	TDP	dB			3 ⁴	
Average Launch Power of Off Transmitter for Each Lanes	Poff	dBm	-		-30	
Extinction Ratio	EX	dB	4.5			
Optical Return Loss Tolerance		dB	20			
Transmitter Reflectance		dB			-26 ³	
Eye Diagram			{0.25, 0.4, 0.45, 0.25, 0.28, 0.4} ⁵			

Eye Mask Margin			≥5%			
Optical Path & Power Budget						
Power budget (for max TDP)		dB			21	
Operating distance		km	40			
Channel insertion loss		dB	10		18	
Maximum discrete reflectance		dB			-26	
Allocation for penalties (for max TDP)		dB			3	
Optical receiver Characteristics						
Receive Rate for Each Lane		Gbps	-	25.78125		
Signaling Speed Accuracy		ppm	-100			
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	
Damage threshold ⁶	Pmax	dBm	-2.5			
Average Receive Power for Each Lane			20.5 ⁷		-3.5	
Receive Power In OMA for Each Lane	OMA	dBm	-		-3.5	
Receiver reflectance		dB			-26	
Receiver Sensitivity in OMA for Each Lane(100GbE) at BER= 5x10 ⁻⁵ BER ⁸	S	dBm			-18.5	
Stressed Receiver Sensitivity in OMA for Each Lane ⁹		dBm				
RX Los Assert level		dBm	-30			
Los Hysteresis		dB	0.5		5	

Note1. Average launch power, each lane (min) is informative and not the principal indicator of signal strength. A transmitter with launch power below this value cannot be compliant; however, a value above this does not ensure compliance.

Note2. Even if the TDP<1dB, the OMA (min) must exceed this value.

Note3. Transmitter reflectance is defined looking into the transmitter.

Note4. TDP does not include a penalty for multi-path interference (MPI).

Note5. Eye mask hit ratio is 5E-5.

Note6. The receiver shall be able to tolerate, without damage, continuous exposure to an optical input signal having this average power level.

Note7. 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.

Note8. Receiver sensitivity (OMA), each lane (max) at 5×10^{-5} BER is a normative specification.

Note9. Measured with conformance test signal at TP3 (Refer to IEEE Std 802.3™2015 Cl. 88.8.10) for BER = 5×10^{-5} .

Hardware Characters

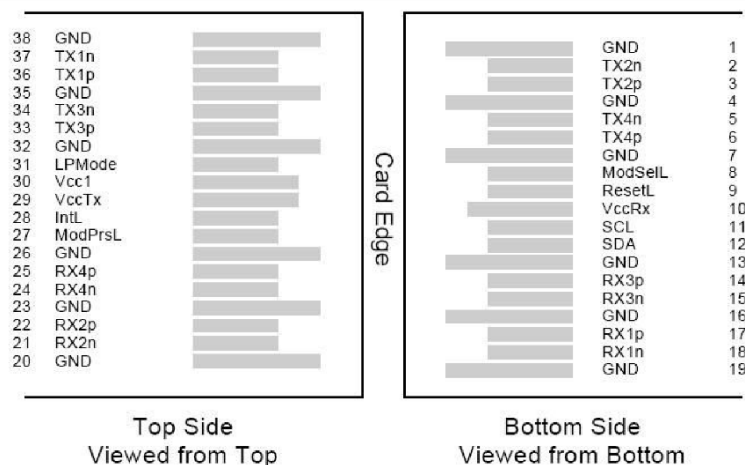


Figure 4.1 QSFP28-compliant 38-PIN connector (per SFF-8679)

Table 8- Electric Ports Definition

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	+3.3V Power Supply Receiver	2

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/RxLosL	Interrupt. Optionally configurable as RxLOSL via the management interface(SFF-8636).	
29	VccTx	+3.3 V Power Supply transmitter	2
30	Vcc1	+3.3 V Power Supply	2
31	LPMode	Low Power Mode. Optionally configurable as TxDis via the management interface(SFF-8636).	
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

Note1. GND is the symbol for signal and supply (power) common for the QSFP28 module. All are common within the module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal common ground plane.

Note2. VccRx, Vcc1 and VccTx are the receiving and transmission power suppliers and shall be applied concurrently. Recommended host board power supply filtering is shown in Figure 3 below. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the module in any combination. The connector PINs are each rated for a maximum current of 1000mA.

MODULE DDM

Table 9- DDM accuracy

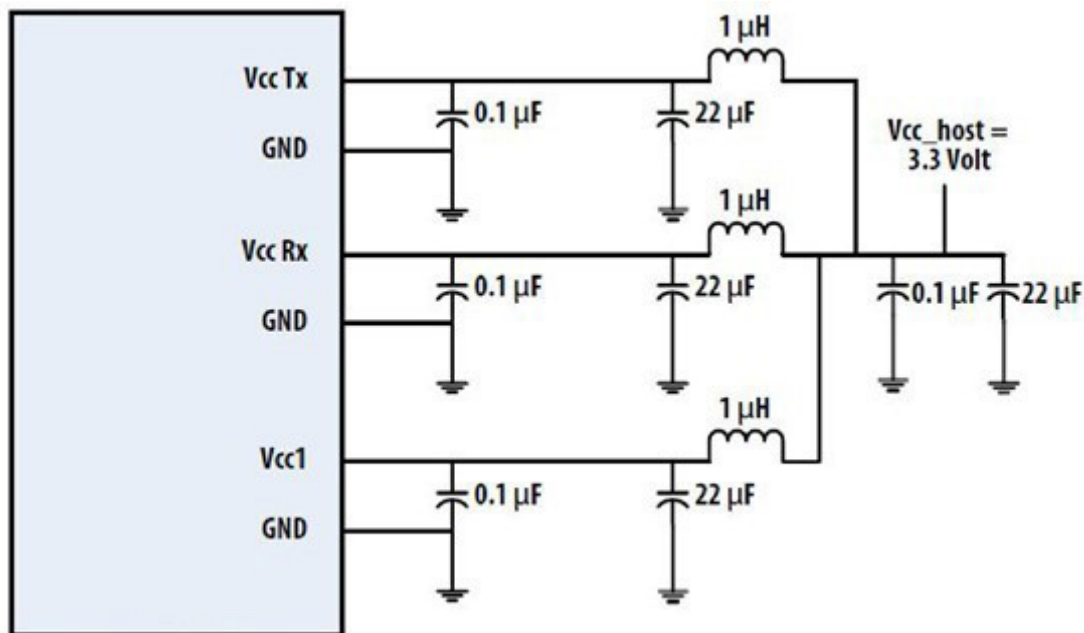
Parameters	Unit	Requirements	Note
Temperature	°C	+/-3	
Voltage	V	+/-5%	
Rx power	dB	+/-3.0	
Tx power	dB	+/-3.0	

Table 10- DDM Alarm & warning threshold

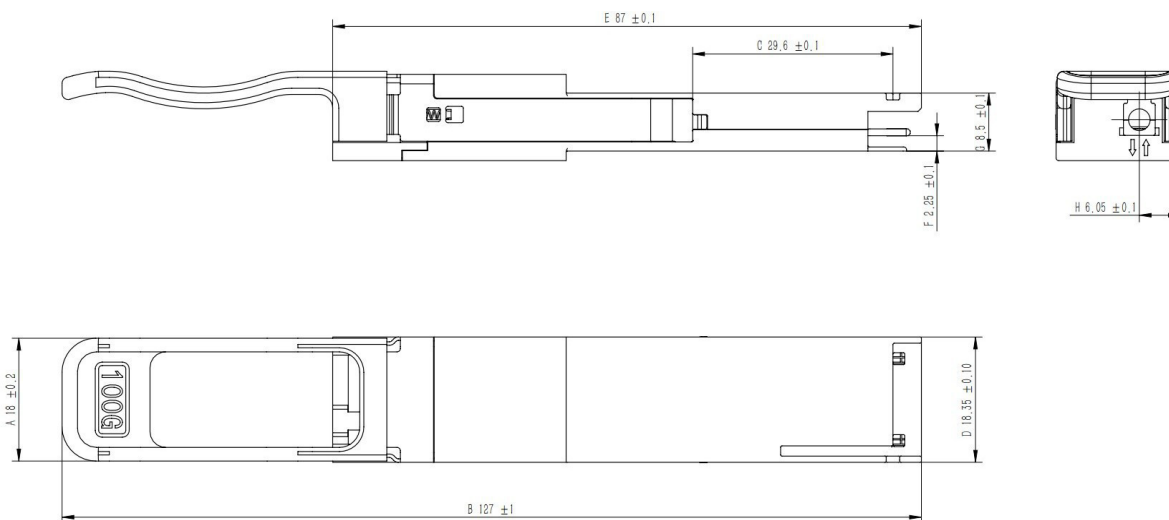
DDM Alarm & warning threshold is listed below:

Parameters	Unit	Requirements	Description
Temp low warning	°C	-20	Min. case temperature
Temp high warning	°C	85	Max. case temperature
Voltage low warning	V	3.135	-5% Vcc target
Voltage high warning	V	3.465	+5% Vcc target
Tx power low warning	dBm	-2.5	
Tx power high warning	dBm	6.5	
Rx power low warning	dBm	-18.5	
Rx power high warning	dBm	-3.5	
Temp low alarm	°C	-23	
Temp high alarm	°C	88	
Voltage low alarm	V	3.041	
Voltage high alarm	V	3.569	
Tx power low alarm	dBm	-4.5	
Tx power high alarm	dBm	8	
Rx power low alarm	dBm	-20.9	
Rx power high alarm	dBm	-1.5	

Recommend Circuit



Mechanical Drawings



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