QSFP-100GB-ER1-CN2-OPC

Ciena® Compatible TAA Compliant 100GBase-ER1 QSFP28 Single Lambda Transceiver (SMF, 1310nm, 40km, LC, DOM)

Features

- Compliant with QSFP28 MSA
- Supports 106.25Gbps (PAM4)
- Duplex LC Connector
- High Sensitivity APD Receiver
- Single-mode Fiber
- Commercial Temperature 0 to 70 Celsius
- Hot Pluggable
- Excellent ESD Protection
- Metal with Lower EMI
- RoHS Compliant and Lead Free

Applications:

- 100GBase Ethernet
- Access and Enterprise

Product Description

This Ciena® compatible QSFP28 transceiver provides 100GBase-ER1 throughput up to 40km over single-mode fiber (SMF) using a wavelength of 1310nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Ciena® transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. Digital optical monitoring (DOM) support is also present to allow access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Maximum Supply Voltage	Vcc	0	3.6	V
Storage Temperature	TS	-40	85	°C
Operating Case Temperature	Tc	0	70	°C
Relative Humidity (No Condensation)	RH	0	85	%
Damage Threshold	THd	0		dBm
Link Distance	D		40	km

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Supply Voltage	Vcc	3.135	3.3	3.465	V	
Supply Current	Icc			1.66	A	
Power Consumption	P_{DISS}		4.5	5.5	W	
Transmitter High-Speed Electrical Characteristics						
Signaling Rate	Rate	25.78125 ± 100ppm			Gbps	
Input Differential Impedance	ZIN		100		Ω	
Differential Input Voltage Per Lane				900	mV	
Input Impedance Mismatch				10	%	
Input High Voltage	VIH	2		Vcc+0.3	V	
Input Low Voltage	VIL	-0.3		0.8	V	
Receiver High-Speed Electrical Characteristics						
Signaling Rate	Rate	25.78125 ± 100ppm			Gbps	
Common-Mode Voltage	Vcm	-350		2850	mV	
Common-Mode Noise (RMS)				17.5	mV	
Differential Termination Resistance Mismatch (At 1MHz)				10	%	
Differential Return Loss (SDD22)				Per CEI-28G-VSR	dB	
Common-Mode to Differential Conversion and Differential to Common-Mode Conversion (SDC22, SCD22)				Per CEI-28G-VSR	dB	
Common-Mode Return Loss (SCC22): From 250MHz to 30GHz				-2		
Transition Time: 20-80%		9.5			ps	
Vertical Eye Closure	VEC			6.5	dB	
Eye Width at 10-15 Probability	EW15	0.57			UI	
Eye Height at 10-15 Probability	EH15	228			mV	

Optical Characteristics (EOL)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter							
Data Rate Per Lane			53.125 ± 100ppm			Gbps	
Modulation Format			PAM4				
Wavelength		λ	1308.09	1309.09	1310.19	nm	
Side-Mode Suppression Ratio		SMSR	30			dB	
Average Launch Power		Pavg	1.7		7.1	dBm	1
Outer Optical Modulation Amplitude (OMAouter)	**TDP<1.4dB**	POMA	4.7		7.9	dBm	
	TDP>1.4dB		3.3+TDP				
Transmitter and Dispersion Penalty		TDP			3.9	dB	
TECQ		TECQ			3.9	dB	
|TDP-TECQ|(Maximum)					2.7	dB	
Extinction Ratio		ER	5.0			dB	
Optical Return Loss Tolerance		ORLT			15	dB	
Transmitter Reflectance		RL			-26	dB	2
Average Launch Power Off Transmitter		Poff			-15	dBm	
RIN15.6 OMA		RIN			-136	dB/Hz	
Receiver							
Data Rate Per Lane			53.125 ± 100ppm			Gbps	
Modulation Format			PAM4				
Lane Wavelength		λ	1304.5~1317.5			nm	
Damage Threshold		THd	-2.4			dBm	3
Average Receive Power			-16		-3.4	dBm	4
Receive Power (OMAouter)					-2.6	dBm	
Receiver Reflectance		RL			-26	dB	
Receiver Sensitivity (OMAouter)	**TECQ<1.4 dB**				-13.8	dBm	
	TECQ>1.4 dB				TECQ-15.2		
Stressed Receiver Sensitivity (OMAouter) Per Lane - Maximum		SRS			-11.3	dBm	5
LOS Assert		LOSA	-30		-19.5	dBm	
LOS De-Assert		LOSD			-16.5	dBm	
LOS Hysteresis		LOSH	0.5			dB	
Conditions of Stress Receiver Sensitivity Test							
Stressed Eye Closure for PAM4 (SECQ) Lane Under Test					3.9	dB	

Notes:

1. Average launch power (minimum) 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.

2. Transmitter Reflectance is defined looking into the transmitter.
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.
4. Average receive power (minimum) 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 a conformance test signal at TP3 for the BER specified in IEEE Std 802.3cd.

Pin Descriptions

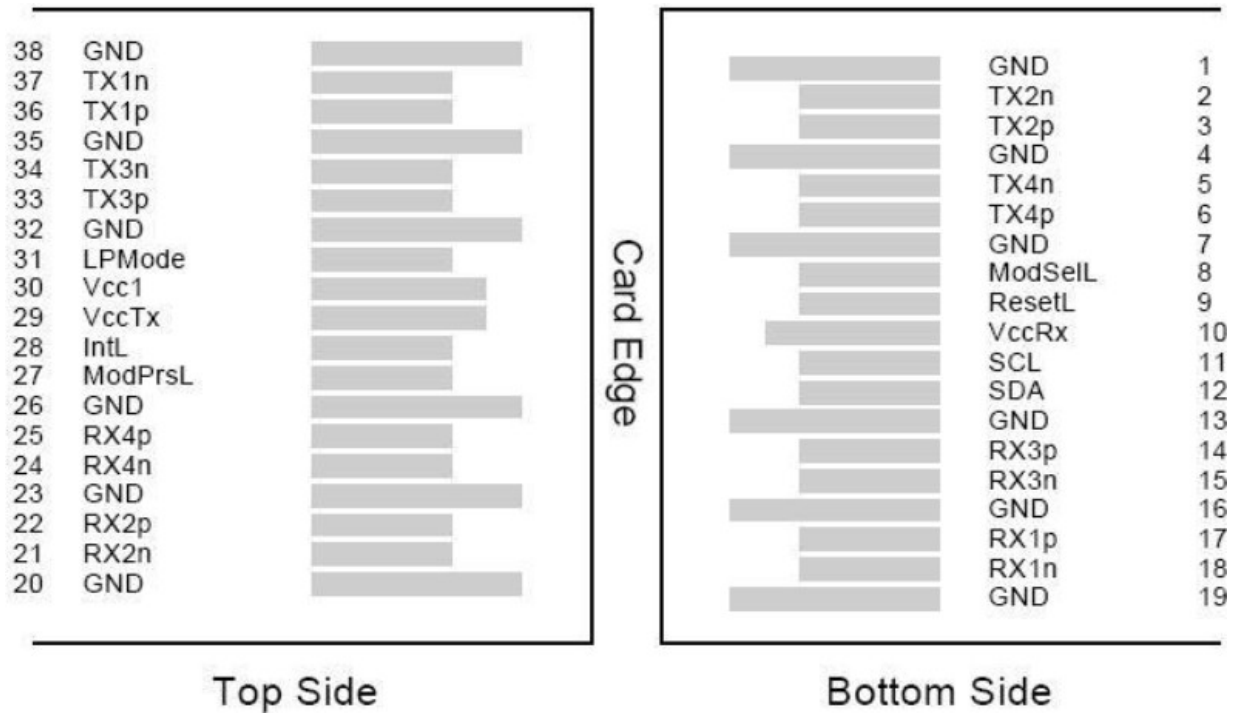
Pin	Symbol	Name/Descriptions	Ref.
1	GND	Transmitter Ground (Common with Receiver Ground).	1
2	Tx2-	Transmitter Inverted Data Input.	
3	Tx2+	Transmitter Non-Inverted Data Output.	
4	GND	Transmitter Ground (Common with Receiver Ground).	1
5	Tx4-	Transmitter Inverted Data Input.	
6	Tx4+	Transmitter Non-Inverted Data Output.	
7	GND	Transmitter Ground (Common with Receiver Ground).	1
8	ModSelL	Module Select.	2
9	ResetL	Module Reset.	2
10	VccRx	+3.3V Power Supply Receiver.	
11	SCL	2-Wire Serial Interface Clock.	2
12	SDA	2-Wire Serial Interface Data.	2
13	GND	Transmitter Ground (Common with Receiver Ground).	1
14	Rx3+	Receiver Non-Inverted Data Output.	
15	Rx3-	Receiver Inverted Data Output.	
16	GND	Transmitter Ground (Common with Receiver Ground).	1
17	Rx1+	Receiver Non-Inverted Data Output.	
18	Rx1-	Receiver Inverted Data Output.	
19	GND	Transmitter Ground (Common with Receiver Ground).	1
20	GND	Transmitter Ground (Common with Receiver Ground).	1
21	Rx2-	Receiver Inverted Data Output.	
22	Rx2+	Receiver Non-Inverted Data Output.	
23	GND	Transmitter Ground (Common with Receiver Ground).	1
24	Rx4-	Receiver Inverted Data Output.	1
25	Rx4+	Receiver Non-Inverted Data Output.	
26	GND	Transmitter Ground (Common with Receiver Ground).	1
27	ModPrsl	Module Present.	
28	IntL	Interrupt.	2
29	VccTx	+3.3V Power Supply Transmitter.	
30	Vcc1	+3.3V Power Supply.	
31	LPMode	Low-Power Mode.	2
32	GND	Transmitter Ground (Common with Receiver Ground).	1
33	Tx3+	Transmitter Non-Inverted Data Input.	
34	Tx3-	Transmitter Inverted Data Output.	
35	GND	Transmitter Ground (Common with Receiver Ground).	1
36	Tx1+	Transmitter Non-Inverted Data Input.	

37	Tx1-	Transmitter Inverted Data Output.	
38	GND	Transmitter Ground (Common with Receiver Ground).	1

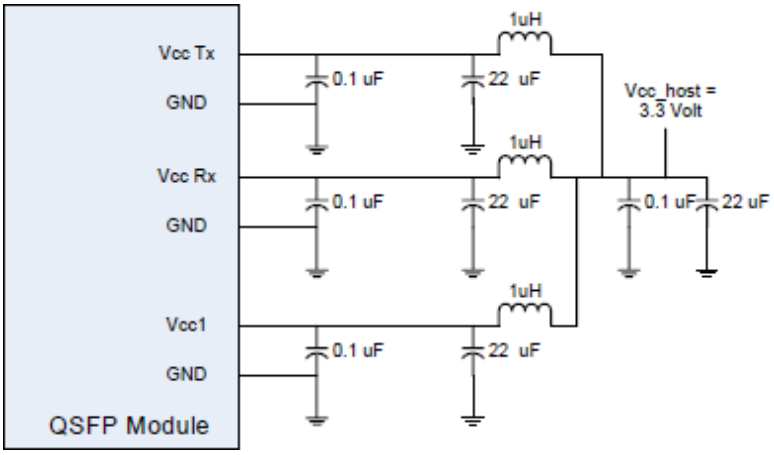
Notes:

1. The module signal grounds are isolated from the module case.
2. This is an open collector/drain output that, on the host board, requires a 4.7KΩ to 10KΩ pull-up resistor to Host_Vcc.

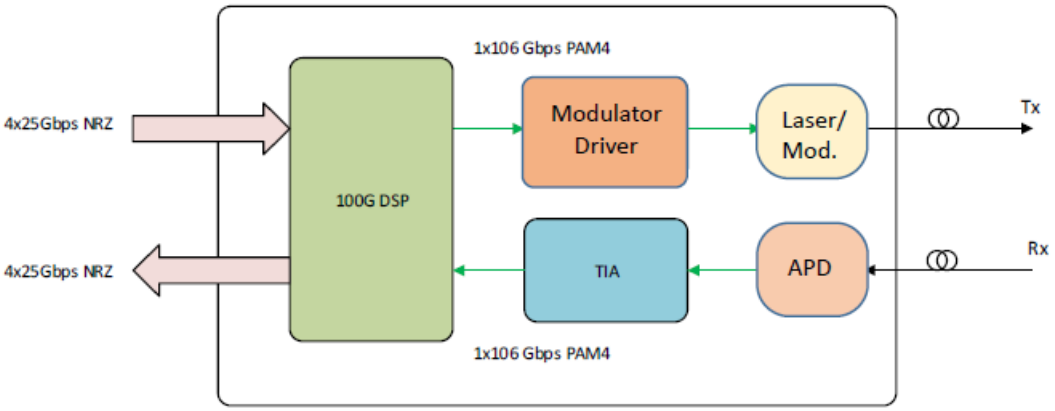
Electrical Pin-Out Details



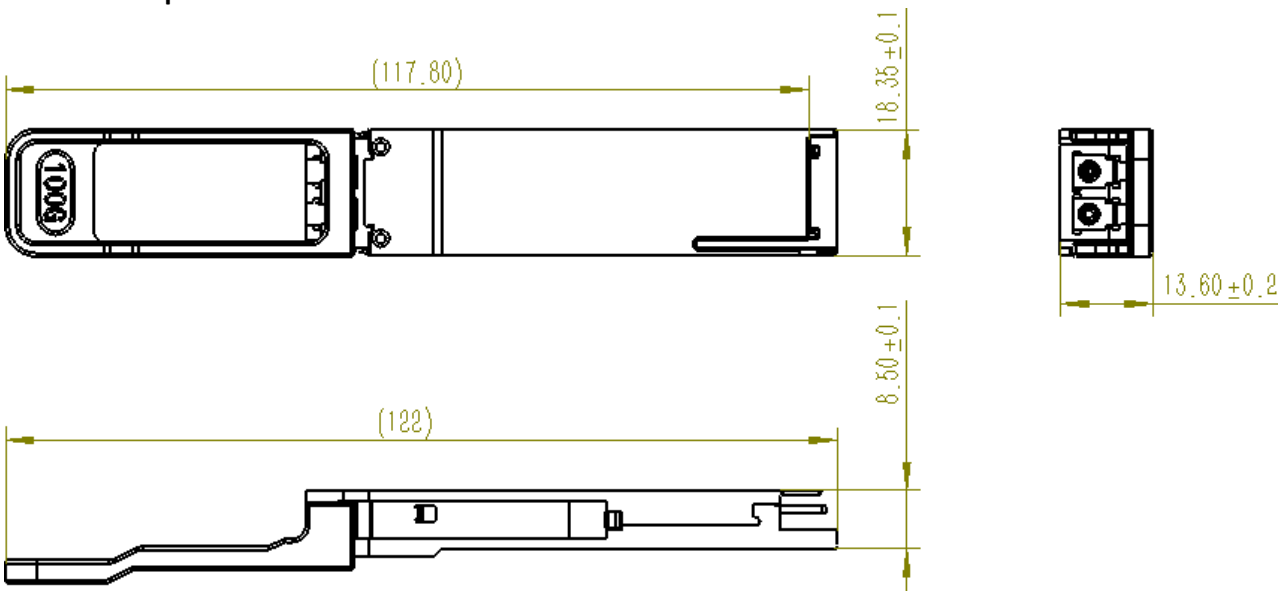
Recommended Power Supply Filter Network



Block Diagram



Mechanical Specifications



Digital Diagnostics

Parameter	Symbol	Min.	Max.	Unit	Notes
Temperature Monitor Absolute Error	DMI_Temp	-3	3	ºC	Over operating temperature range
Supply Voltage Monitor Absolute Error	DMI_Vcc	-0.1	0.1	V	Over full operating range
Channel Rx Power Monitor Absolute Error	DMI_Rx_Ch	-3	3	dB	1
Channel Bias Current Monitor	DMI_Ibias_Ch	-10%	10%	mA	
Channel Tx Power Monitor Absolute Error	DMI_Tx_Ch	-3	3	dB	1

Notes:

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