

### QSFP-100GB-130914-20-E-EX-AO

Extreme Networks® Compatible TAA 100GBase-OWDM QSFP28 Transceiver O-Band Channel OW309 50GHz (SMF, 1309.14nm, 20km, LC, DOM, 5 to 80C)

#### Features

- Hot-pluggable QSFP28 form factor
- Supports 106.25Gb/s (PAM4)
- Compliant with QSFP28 MSA
- High Sensitivity APD Receiver
- OWDM 8 Wavelengths
- Duplex LC receptacles
- Aligned with IEEE 802.3bs and 100G Lambda MSA
- Single +3.3V power supply
- Operating temperature: -5 to +80 Celsius
- I2C management interface
- RoHS Compliant and Lead-Free



#### Applications

- 100GBase Ethernet
- Access and Enterprise

#### Product Description

This Extreme Networks® compatible QSFP28 transceiver provides 100GBase-OWDM throughput up to 20km over single-mode fiber (SMF) using a wavelength of 1309.14nm via an LC connector. It can operate at temperatures between 5 and 80C. Our transceiver is built to meet or exceed OEM specifications and is guaranteed to be 100% compatible with Extreme Networks®. It has been programmed, uniquely serialized, and tested for data-traffic and application to ensure that it will initialize and perform identically. All of our transceivers comply with Multi-Source Agreement (MSA) standards to provide seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows 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.

AddOn's transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S.-made or designated country end products."



## Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Maximum Supply Voltage	Vcc	0	3.6	V
Storage Temperature	Tstg	-40	85	°C
Operating Case Temperature	Tc	-5	80	°C
Relative Humidity (No Condensation)	RH	0	85	%
Damage Threshold	THd	0		dBm
Link Distance Through Mux	D		20	km
Link Distance Back-to-Back	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			1.8	A	
Power Consumption			4.7 at -5°C 4.4 at 25°C 5.2 at 80°C	5.0 at -5°C 4.8 at 25°C 5.5 at 80°C	W	
<b>Transmitter High-Speed Electrical Characteristics</b>						
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	
<b>Receiver High-Speed Electrical Characteristics</b>						
Signaling Rate	Rate	25.78125 ± 100ppm			Gbps	
Common-Mode Voltage	Vcm	-350		2850	mV	
Common-Mode Noise (RMS)				17.5	mV	20-80%
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 <sup>-15</sup> Probability	EW15	0.57			UI	
Eye Height at 10 <sup>-15</sup> Probability	EH15	228			mV	

### Optical Characteristics (EOL)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
<b>Transmitter</b>							
Data Rate Per Lane			53.125 ± 100ppm			Gbps	
Modulation Format			PAM4				
Wavelength		λ	1308.74	1309.14	1309.54	nm	
Side-Mode Suppression Ratio		SMSR	30			dB	
Average Launch Power		Pavg	0		3.4	dBm	1
Outer Optical Modulation Amplitude (OMA <sub>outer</sub> )	TDP<1.4dB	POMA	3.0		6.4	dBm	
	TDP>1.4dB		1.6+TDP		6.4	dBm	
Transmitter and Dispersion Penalty		TDP			3.4	dB	
TECQ		TECQ			3.9	dB	
TDP-TECQ  (Maximum)					2.5	dB	
Extinction Ratio		ER	5.0			dB	
Optical Return Loss Tolerance		ORLT			15.6	dB	
Transmitter Reflectance		RL			-26	dB	2
Average Launch Power Off Transmitter		Poff			-15	dBm	
RIN <sub>15.6OMA</sub>		RIN			-136	dB/Hz	
<b>Receiver</b>							
Data Rate Per Lane			53.125 ± 100ppm			Gbps	
Modulation Format			PAM				
Lane Wavelength		λ	1295.04~1311.96			nm	
Damage Threshold		THd	0			dBm	3
Average Receive Power			-15.7		-3	dBm	4
Receive Power (OMA <sub>outer</sub> )					-2.6	dBm	
Receiver Reflectance		RL			-26	dB	
Receiver Sensitivity (OMA <sub>outer</sub> )						dBm	5, 6
Stressed Receiver Sensitivity (OMA <sub>outer</sub> ) Per Lane (Maximum)		SRS			-11.6	dBm	
Transmitter Reflectance		RL			-26	dB	
LOS Assert		LOSA	-30		-19.5	dBm	

LOS De-Assert	LOSD			-16.5	dBm	
LOS Hysteresis	LOSH	0.5			dB	
<b>Conditions of Stress Receiver Sensitivity Test</b>						
Stressed Eye Closure for PAM4 (SECQ) Lane Under Test				3.4	dB	
SECQ – $10 \cdot \log_{10}(\text{Ceq})$ Lane Under Test				3.4	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. Receiver Sensitivity (OMA<sub>outer</sub>) (maximum) is informative and is defined for a transmitter with a value of SECQ up to 3.4dB for 100G ER1 O-Band WDM.
6. Measured with a conformance test signal at TP3 (see 3.11) for the BER specified in IEEE Std 802.3.

## Pin Descriptions

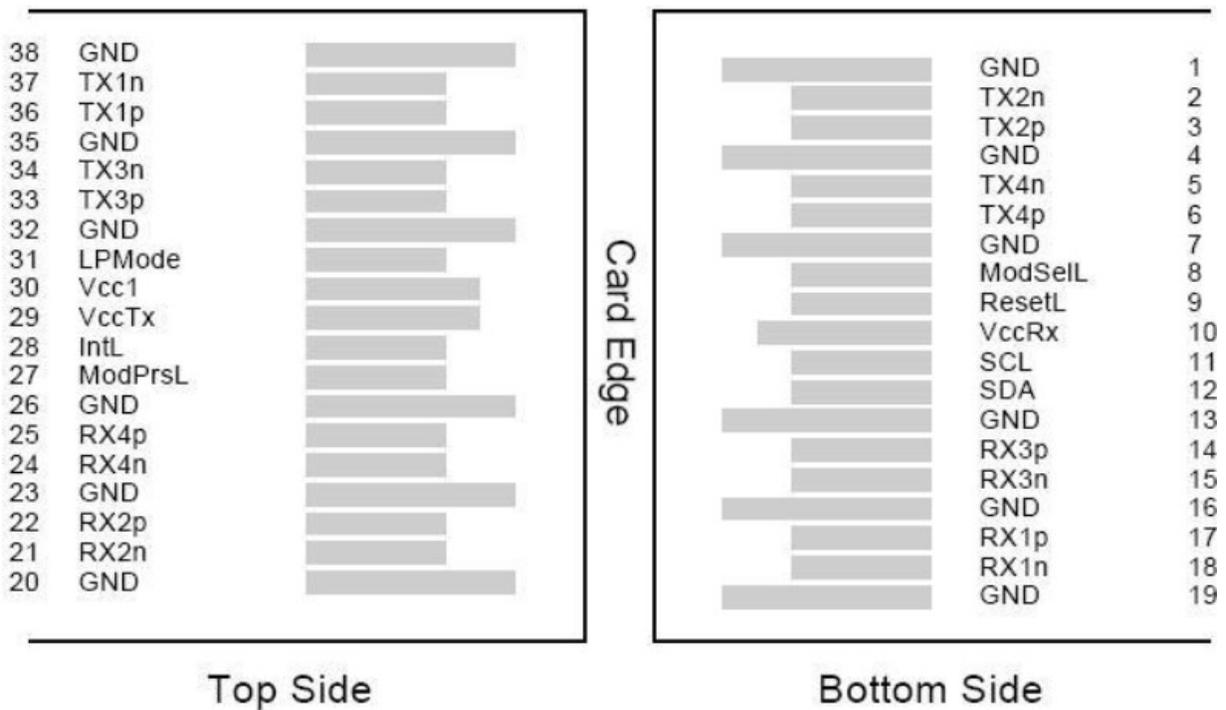
Pin	Symbol	Name/Descriptions	Notes
1	GND	Transmitter Ground (Common with Receiver Ground).	1
2	Tx2-	Transmitter Inverted Data Input.	
3	Tx2+	Transmitter Non-Inverted Data Output.	
4	GND	Transmitter Ground (Common with Receiver Ground).	1
5	Tx4-	Transmitter Inverted Data Input.	
6	Tx4+	Transmitter Non-Inverted 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

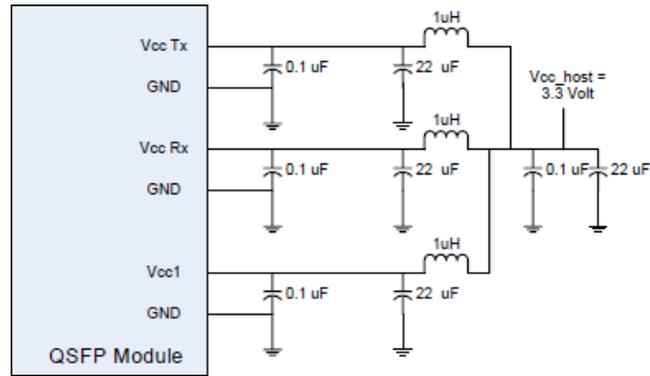
**Notes:**

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.

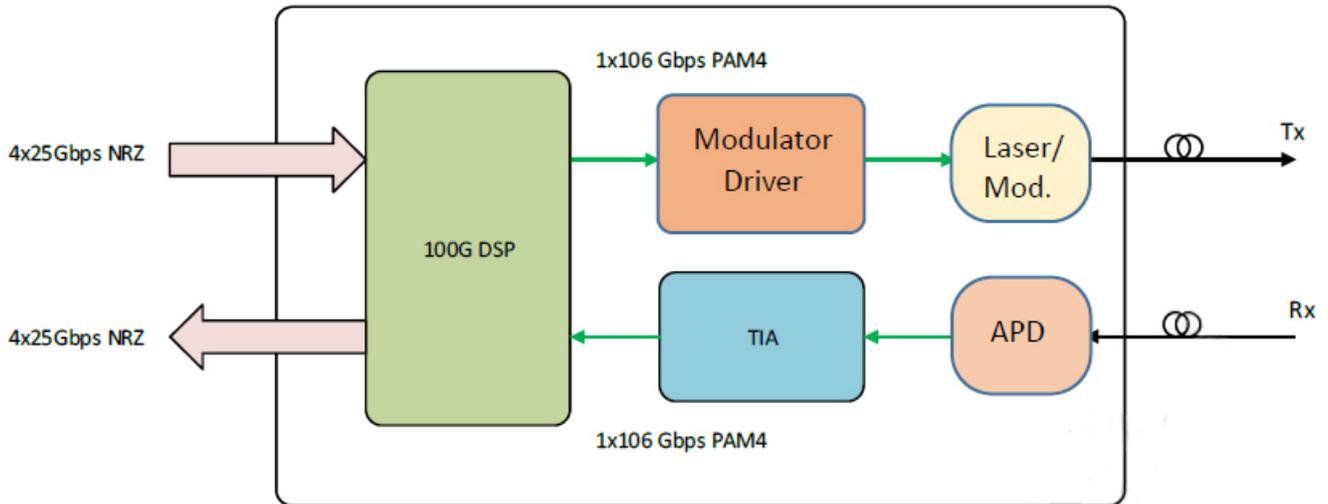
**Electrical Pin-Out Details**



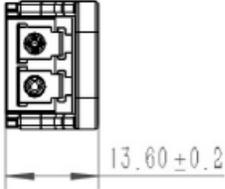
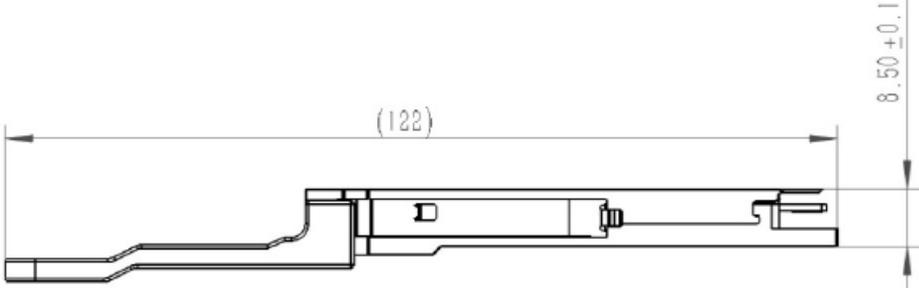
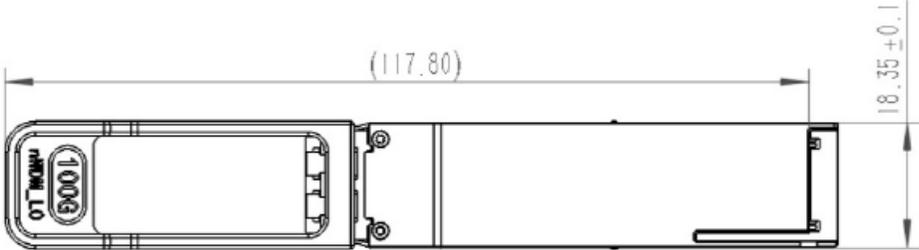
### Recommended Host Board Power Supply Filter Network



### Block Diagram



**Mechanical Specifications**



## About AddOn Networks

In 1999, AddOn Networks entered the market with a single product. Our founders fulfilled a severe shortage for compatible, cost-effective optical transceivers that compete at the same performance levels as leading OEM manufacturers. Adhering to the idea of redefining service and product quality not previously had in the fiber optic networking industry, AddOn invested resources in solution design, production, fulfillment, and global support.

Combining one of the most extensive and stringent testing processes in the industry, an exceptional free tech support center, and a consistent roll-out of innovative technologies, AddOn has continually set industry standards of quality and reliability throughout its history.

Reliability is the cornerstone of any optical fiber network and is engrained in AddOn's DNA. It has played a key role in nurturing the long-term relationships developed over the years with customers. AddOn remains committed to exceeding industry standards with certifications from ranging from NEBS Level 3 to ISO 9001:2005 with every new development while maintaining the signature reliability of its products.



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