

### QSFP28-100GB-4WDM40-RW-AO

Ruckus Wireless® Compatible TAA 100GBase-4WDM-40 QSFP28 Transceiver (SMF, 1295nm to 1309nm, 40km, LC, DOM)

#### Features

- QSFP28 MSA compliant
- Single 3.3V Power Supply and Power dissipation < 4.8W
- Supports 103Gbps
- Operating case temperature: 0 to 70C
- Four 25Gbps DFB-based LAN-WDM transmitter
- Up to 40km over SMF with FEC on host
- 4x25G electrical interface
- PIN and TIA array on the receiver side
- I2C interface with integrated Digital Diagnostic Monitoring
- Duplex LC receptacles
- RoHS Compliant and Lead Free



#### Applications

- 100GBase Ethernet
- Access and Enterprise

#### Product Description

This Ruckus Wireless® QSFP28 transceiver provides 100GBase-4WDM-40 throughput up to 40km over single-mode fiber (SMF) using a wavelength of 1295nm to 1309nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Ruckus Wireless® 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.

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	-0.5	3.6	V
Storage Temperature	TS	-40	+85	°C
Operating Case Temperature	Tc	0	70	°C
Operating Humidity	RH	5	85	%

## Electrical Characteristics

Parameter	Test Point	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	Vcc	3.135	3.3	3.465	V	
Power Dissipation	PD			5	W	
<b>Transmitter</b>						
Differential data input swing per lane				900	mVp-p	
Input Impedance (Differential)	Zin			10	%	
<b>Stressed Input Parameters</b>						
Eye width		0.46			UI	
Applied pk-pk sinusoidal jitter		IEEE 802.3bm Table 88-13				
Eye height		95			mv	
DC common mode voltage		-350		2850	mv	
<b>Receiver</b>						
Differential output amplitude		200		900	mVp-p	
Output Impedance (Differential)	Zout			10	%	
Eye width		0.57			UI	
Eye height differential		228			mv	
Vertical eye closure				5.5	dB	

## Optical Characteristics

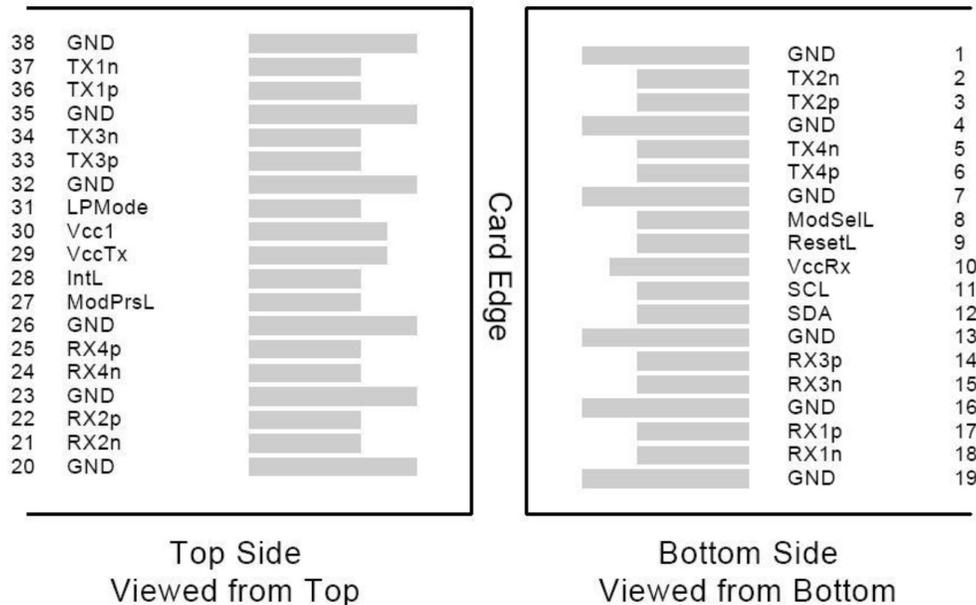
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
<b>Transmitter</b>						
Signaling Speed per Lane	BRAVE		25.78		Gbps	
Data Rate Variation		-100		+100	ppm	
Lane_0 Center Wavelength	$\lambda_{C0}$	1294.53	1295.56	1296.59	nm	
Lane_1 Center Wavelength	$\lambda_{C1}$	1299.02	1300.05	1301.09	nm	
Lane_2 Center Wavelength	$\lambda_{C2}$	1303.54	1304.58	1305.63	nm	
Lane_3 Center Wavelength	$\lambda_{C3}$	1308.09	1309.14	1310.19	nm	
Total Average Output Power	Po			12.5	dBm	
Average Launch Power per Lane	Peach	-2.5		6.5	dBm	1
Average launch power of OFF transmitter per lane				-30	dBm	
Side-mode suppression ratio	SMSR <sub>min</sub>	30			dB	
Optical modulation amplitude	P <sub>oma</sub>	0.5		6.5	dBm	2
Difference in launch power between any two lanes (OMA)				4	dB	
Optical Return Loss Tolerance		20			dB	
Transmitter reflectance				-26		3
Extinction Ratio	ER	4.5			dB	4
Transmitter Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3}		{0.31, 0.4, 0.45, 0.34, 0.38, 0.4}				4
<b>Receiver</b>						
Signaling Speed per Lane	BRAVE		25.78		Gbps	
Data Rate Variation		-100		+100	ppm	
Damage threshold per Lane	R <sub>dam</sub>	-2.5			dBm	
Lane_0 Center Wavelength	$\lambda_{C0}$	1294.53	1295.56	1296.59	nm	
Lane_1 Center Wavelength	$\lambda_{C1}$	1299.02	1300.05	1301.09	nm	
Lane_2 Center Wavelength	$\lambda_{C2}$	1303.54	1304.58	1305.63	nm	
Lane_3 Center Wavelength	$\lambda_{C3}$	1308.09	1309.14	1310.19	nm	
Average Receive Power per Lane	R <sub>xpow</sub>	-20.5		-3.5	dBm	5
Receive Sensitivity in OMA per Lane	R <sub>xsens</sub>			-18.5	dBm	6
Stressed Receiver Sensitivity (OMA) per Lane	R <sub>X</sub> SRS			-16	dBm	7
Optical Return Loss	ORL			-26	dB	
LOS Assert	LOSA	-30			dBm	
LOS De-Assert	LOSD			-20	dBm	
LOS Hysteresis		0.5			dB	
<b>Conditions of Receiver Sensitivity Test (Note 8)</b>						
Vertical Eye Closure Penalty	VECP		2.5		dB	
Stressed Eye J2 Jitter			0.33		UI	

Stressed Eye J4 Jitter		0.48		UI	
SRS Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3}		{0.39, 0.5, 0.5, 0.39, 0.4}			

**Notes:**

1. 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.
2. Even if the TDP < 1.0dB, the OMA (min) must exceed this value.
3. Transmitter reflectance is defined looking into the transmitter.
4. Eye mask hit ratio is 5E-5.
5. Average launch 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.
6. Receiver sensitivity (OMA), each lane (max) at 5E-5 BER is a normative specification.
7. Measured with conformance test signal at TP3 for BER = 5\*10<sup>-5</sup>.
8. Vertical eye closure penalty, stressed eye J2 Jitter, stressed eye J4 Jitter, and SRS eye mask definition are test conditions for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

**Electrical Pin-out Details**



## Pin Descriptions

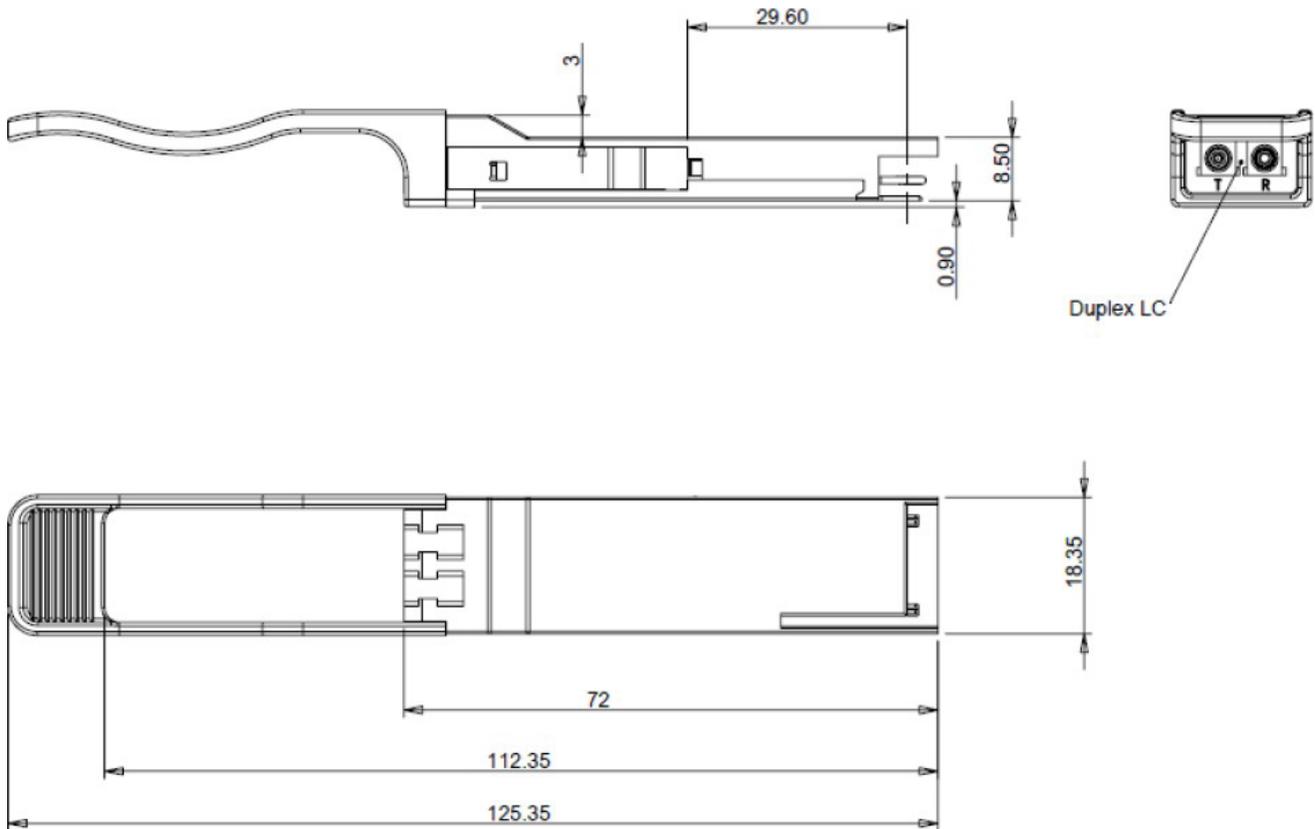
Pin	Symbol	Name/Descriptions	Ref.
1	GND	Ground	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data output	
4	GND	Ground	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data output	
7	GND	Ground	1
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	VccRx	+3.3V Power Supply Receiver	2
11	SCL	2-Wire Serial Interface Clock	1
12	SDA	2-Wire Serial Interface Data	
13	GND	Ground	
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	1
25	Rx4p	Receiver non-Inverted Data output	
26	GND	Ground	1
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	VccTx	+3.3V Power Supply Transmitter	2
30	Vccl	+3.3V Power Supply	2
31	LPMMode	Low Power Mode	
32	GND	Ground	1
33	Tx3p	Transmitter Non-Inverted Data input	
34	Tx3n	Transmitter Inverted Data output	
35	GND	Ground	1
36	Tx1p	Transmitter Non-Inverted Data input	
37	Tx1n	Transmitter Inverted Data output	
38	GND	Ground	1

**Notes:**

1. GND is the symbol for signal and supply (power) common for QSPF28 modules. All are common within the QSPF28 module and all module voltages are referenced to this potential unless otherwise noted. Connected these directly to the host board signal common ground plane.
2. VccRx, Vcc1 and VccTx are the receiving and transmission power suppliers and shall be applied concurrently. VccRx, Vcc1 and VccTx may be internally connected within the QSFP28 transceiver module in any combination. The connector pins are each rated for a maximum current of 1000mA.

**Mechanical Specifications**

Measurement unit: mm



## 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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