QSFP28-100GB-4WDM40-I-AO

MSA and TAA 100GBase-4WDM-40 QSFP28 Transceiver (SMF, 1295nm to 1309nm, 40km, LC, DOM, -40 to 85C)

Features

- QSFP28 MSA compliant
- Single 3.3V Power Supply and Power dissipation < 5W
- Supports 103Gbps
- Operating case temperature: -40C to 85C
- Four 25Gbps Cooled DFB-based LAN-WDM lasers on transmitter side
- Up to 40km over SMF with FEC on host
- 4x25G electrical interface
- APD and TIA array on the receiver side
- I2C interface with integrated Digital Diagnostic Monitoring
- Duplex LC receptacles
- RoHS compliant

Applications

- 100G Datacom & Telecom connections
- 100G 40km application with FEC on host side
- Access and Enterprise

Product Description

This MSA Compliant 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 built to MSA standards and is uniquely serialized and data-traffic and application tested to ensure that they will integrate into your network seamlessly. 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."

Rev. 053023

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	-40	85	°C
Operating Relative Humidity	RH	5	85	%

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	Vcc	3.135	3.3	3.465	V	
Power Dissipation	PD			5	W	
Transmitter						
Differential data input swing per lane				900	mvp-p	
Input Impedance (Differential)	Zin			10	%	
Stressed Input Parameters						
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	
Receiver						
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
Transmitter						
Signaling Speed per Lane	BR$_{AVE}$		25.78		Gbps	
Data Rate Variation		-100		+100	ppm	
Lane_0 Center Wavelength	λ_{C0}	1294.53	1295.56	1296.59	nm	
Lane_1 Center Wavelength	λ_{C1}	1299.02	1300.05	1301.09	nm	
Lane_2 Center Wavelength	λ_{C2}	1303.54	1304.58	1305.63	nm	
Lane_3 Center Wavelength	λ_{C3}	1308.09	1309.14	1310.19	nm	
Total Average Launch Power	PT			12.5	dBm	
Average Launch Power per Lane	Peach	-2.5		6.5	dBm	1
Optical Modulation Amplitude (OMA) each Lane (max)	OMAmax			6.5	dBm	
Optical Modulation Amplitude (OMA), each lane (min)	OMAmin	0.5			dBm	2
Launch power in OMA minus TDP, each lane (min)	OMA-TDP	-0.5			dBm	
Average launch Power of OFF Transmitter per Lane				-30	dBm	
Side-mode suppression ratio	SMSRmin	30			dB	
Difference in Launch Power Between Any Two Lanes (OMA)				4	dB	
Optical Return Loss Tolerance		20			dB	
Transmitter Reflectance				-26	dB	3
Extinction Ratio	ER	4.5			dB	4
Transmitter Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3}		{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}				4
Receiver						
Signaling Speed per Lane	BR$_{AVE}$		25.78		Gbps	
Data Rate Variation		-100		+100	ppm	
Receiver Overload per Lane	Psat	-3			dBm	
Lane_0 Center Wavelength	λ_{C0}	1294.53	1295.56	1296.59	nm	
Lane_1 Center Wavelength	λ_{C1}	1299.02	1300.05	1301.09	nm	
Lane_2 Center Wavelength	λ_{C2}	1303.54	1304.58	1305.63	nm	
Lane_3 Center Wavelength	λ_{C3}	1308.09	1309.14	1310.19	nm	
Average Receive Power per Lane	Rxpow	-20.5		-3.5	dBm	5
Damage threshold per lane (min)	Pdamage			-2.5	dBm	6
Receive Sensitivity in (OMA) per Lane	Rxsens			-18.5	dBm	7
Stressed Receiver Sensitivity (OMA) per Lane	RX$_{SRS}$			-16	dBm	8
Optical Return Loss	ORL			-26	dB	
LOS Assert	LOSA	-30			dBm	

LOS De-Assert	LOSD			-21	dBm	
LOS Hysteresis		0.5			dB	
Conditions of Receiver Sensitivity Test						
Vertical Eye Closure Penalty per lane	2.5				dB	9
Stressed Eye J2 Jitter per lane	0.33				UI	9
Stressed Eye J4 Jitter per lane	0.48				UI	9
SRS eye mask definition {X1, X2, X3, Y1, Y2, Y3}	{0.39, 0.5, 0.5, 0.39, 0.39, 0.4}					9

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 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.
6. The receiver shall be able to tolerate, without damage, continuous exposure to an optical signal having this average power level.
7. Receiver sensitivity (OMA), each lane (max) at 5E-5 BER is a normative specification.
8. Measured with conformance test signal at TP3 for BER = $5*10^{-5}$.
9. 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

Top Side
Viewed from Top

38	GND
37	TX1n
36	TX1p
35	GND
34	TX3n
33	TX3p
32	GND
31	LPMode
30	Vcc1
29	VccTx
28	IntL
27	ModPrsL
26	GND
25	RX4p
24	RX4n
23	GND
22	RX2p
21	RX2n
20	GND

Card Edge

Bottom Side
Viewed from Bottom

GND	1
TX2n	2
TX2p	3
GND	4
TX4n	5
TX4p	6
GND	7
ModSelL	8
ResetL	9
VccRx	10
SCL	11
SDA	12
GND	13
RX3p	14
RX3n	15
GND	16
RX1p	17
RX1n	18
GND	19
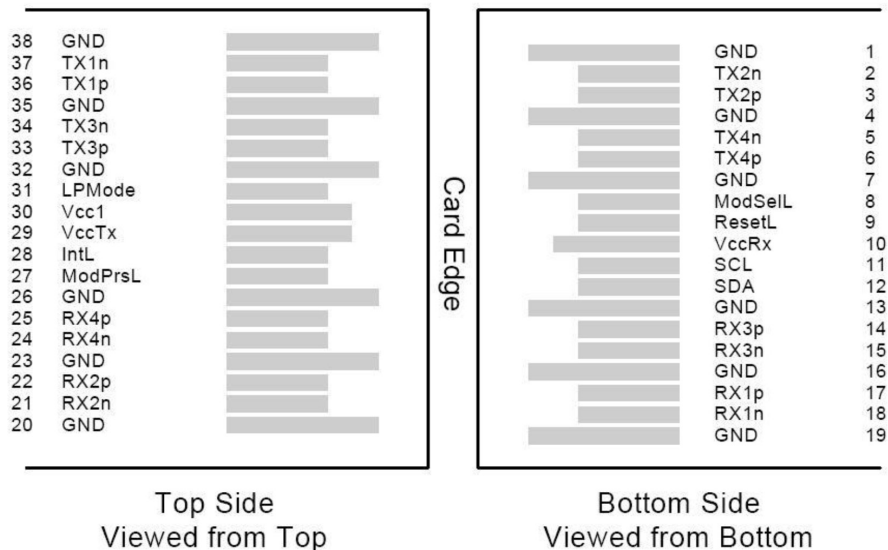
Pin Descriptions

Pin	Logic	Symbol	Name/Descriptions	Plug Sequence	Ref.
1		GND	Ground	1	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	3	
3	CML-I	Tx2p	Transmitter Non-Inverted Data Input	3	
4		GND	Ground	1	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	3	
6	CML-I	Tx4p	Transmitter Non-Inverted Data output	3	
7		GND	Ground	1	1
8	LVTTL-I	ModSelL	Module Select	3	
9	LVTTL-I	ResetL	Module Reset	3	
10		VccRx	+3.3V Power Supply Receiver	2	2
11	LVCMOS- I/O	SCL	2-Wire Serial Interface Clock	3	
12	LVCMOS- I/O	SDA	2-Wire Serial Interface Data	3	
13		GND	Ground	1	1
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	3	
15	CML-O	Rx3n	Receiver Inverted Data Output	3	
16		GND	Ground	1	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	3	
18	CML-O	Rx1n	Receiver Inverted Data Output	3	
19		GND	Ground	1	1
20		GND	Ground	1	1
21	CML-O	Rx2n	Receiver Inverted Data Output	3	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	3	
23		GND	Ground	1	1
24	CML-O	Rx4n	Receiver Inverted Data Output	3	
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	3	
26		GND	Ground	1	1
27	LVTTL-O	ModPrsL	Module Present	3	
28	LVTTL-O	IntL	Interrupt	3	
29		VccTx	+3.3V Power Supply Transmitter	2	2
30		Vccl	+3.3V Power Supply	2	2
31	LVTTL-I	LPMode	Low Power Mode	3	
32		GND	Ground	1	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	3	
34	CML-I	Tx3n	Transmitter Inverted Data Input	3	
35		GND	Ground	1	1

36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	3	
37	CML-I	Tx1n	Transmitter Inverted Data Input	3	
38		GND	Ground	1	1

Notes:

1. GND is the symbol for signal and supply (power) common for the QSFP28 module. 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 supplies and shall be applied concurrently. Vcc Rx Vcc1 and Vcc Tx may be internally connected within the QSFP28 Module in any combination. The connector pins are each rated for a maximum current of 1000mA.

Mechanical Specifications
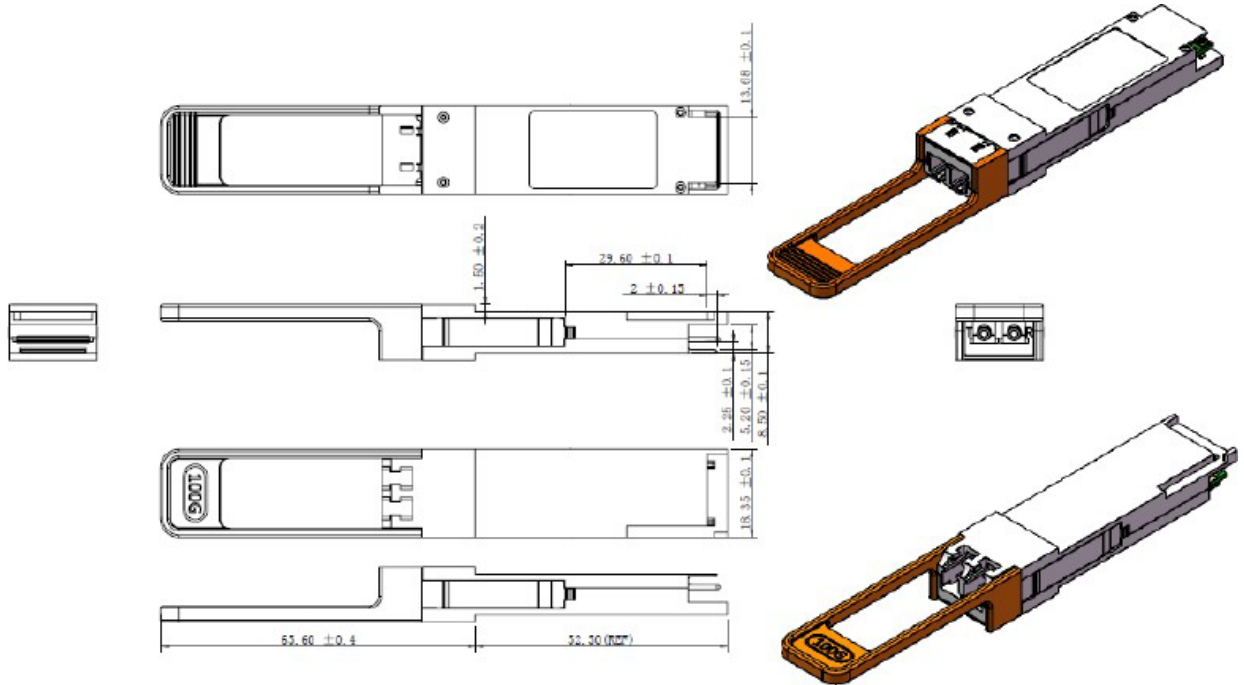
About AddOn Networks

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 in 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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