MMA4Z00-NS400-C

Mellanox® MMA4Z00-NS400 Compatible TAA 400GBase-SR4 PAM4 OSFP112 RHS Transceiver (MMF, 850nm, 50m, MPO, DOM, CMIS 5.0)

Features:

- OSFP MSA Compliant
- Compliant with IEEE 802.3db 400GBASE-SR4
- Bi-directional operation: 4x Tx, and 4x Rx at 106.25Gbps with 53.125GBd PAM4 modulation scheme
- Single MPO-12 Connector
- Commercial Temperature: 0 to 70 Celsius
- VCSEL Transmitter
- Built in DSP
- Hot Pluggable
- RoHS Compliant and Lead-Free

Applications:

- 400GBase Ethernet
- 1x Fibre Channel
- Access and Enterprise

Product Description

This Mellanox® MMA4Z00-NS400 compatible OSFP112 RHS transceiver provides 400GBase-SR4 throughput up to 50m over multi-mode fiber (MMF) PAM4 using a wavelength of 850nm via an MPO connector. It can operate at temperatures between 0 and 70C. Our transceiver is built to meet or exceed OEM specifications and is guaranteed to be 100% compatible with Mellanox®. 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.

ProLabs' 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.")

TAA COMPLIANT

Rev. 012026

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	Vcc	-0.3		3.6	V	
Storage Temperature	Tstg	-40		85	°C	
Operating Case Temperature	Tc	0		70	°C	1
Relative Humidity (non-condensing)	RH	5		85	%	
Data rate	DR		106.25		Gbps	
ESD		-1000		1000	V	High speed
		-2000		2000	V	Others

Notes:

1. Exceeding the Absolute Maximum Ratings table may cause permanent damage to the device. This is just an emphasized rating and does not involve the functional operation of the device that exceeds the specifications of this technical specification under these or other conditions. Long-term operation under Absolute Maximum Ratings will affect the reliability of the device.

Electrical Characteristics

Parameter	Symbol / Test Point	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	Vcc	3.135	3.3	3.465	V	
Transceiver Power Consumption	TD			8.5	W	
Transmitter Input Specifications						
Rx Signaling Rate	TP1a		53.125		GBd	
Single-Ended Voltage Tolerance Range	TP1a	-0.4		3.3	V	
DC Common-Mode Voltage	TP1a	-0.3		2.8	V	
AC Common Mode Output Voltage (rms)	TP1a			32 (LF) 80 (Full Band)	mV	
Eye Height	TP1a	10			mV	
Vertical Eye Closure (VEC)				12	dB	
Effective Return Loss		7.3			dB	
Differential Pk-Pk Input Voltage		35		750	mV	
Rx Differential Termination Mismatch	TP1			10	%	
Receiver Output Specifications						
AC Common Mode Output Voltage (rms)	TP4			32 (LF) 80 (Full Band)	mV	
Differential Pk-Pk Output Voltage	TP4			600 (short mode) 845 (long mode)	mV	
Eye Height, Differential	TP4	15			mV	
Effective Return Loss, ERL	TP4	8.5			dB	
Differential Termination Mismatch	TP4			10	%	
Transition Time (min, 20% to 80%)	TP4	8.5			ps	
DC Common Mode Voltage	TP4	-350		2850	mV	

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter (@TP2 Test Point)						
Tx Optical Power	TxP	-4.6		4	dBm	
Extinction Ratio	ER	2.5			dB	
Outer Optical Modulation Amplitude (OMA_{outer})	P_{OMA}	-2.6dBm max(TECQ, TDECQ) <1.8dB -4.4dBm + max (TECQ, TDECQ) 1.8<max (TECQ,TDE CQ)<=4.4dB		3.5	dBm	
Average Launch Power of OFF Transmitter, each Lane	Poff			-30	dBm	
Wavelength Range	λ	840		868	nm	
Spectral Width	RMS			0.6	nm	
$RIN_{12}OMA$	$RIN_{12}OMA$			-132	dB/Hz	
Optical Return Loss Tolerance	ORL			14	dB	
Transmitter and Dispersion Eye Closure for PAM4 (TDECQ)				4.4	dB	
Receiver (@TP3 Test Point)						
Damage Threshold		5			dBm	1
Average Receiver Power		-6.4		4	dBm	
Average Receiver Power, each Lane	**OMA_{outer}**			3.5	dBm	
Center Wavelength	λ	840		868	nm	
Receiver Reflectance				-15	dB	
Receiver Sensitivity (OMA_{outer}) @$2^{10^{-4}}$	SEN			Max (-4.6, SECQ-6.4)	dBm	
Stressed Receiver Sensitivity (OMA_{outer})				-2	dBm	
SECQ		4.4			dB	
OMAouter of each aggressor lane		3.5			dBm	

Notes:

1. The receiver shall be able to tolerate, without damage, continuous exposure to an optical input signal having this average power level on one lane. The receiver does not have to operate correctly at this input power.

Pin Descriptions

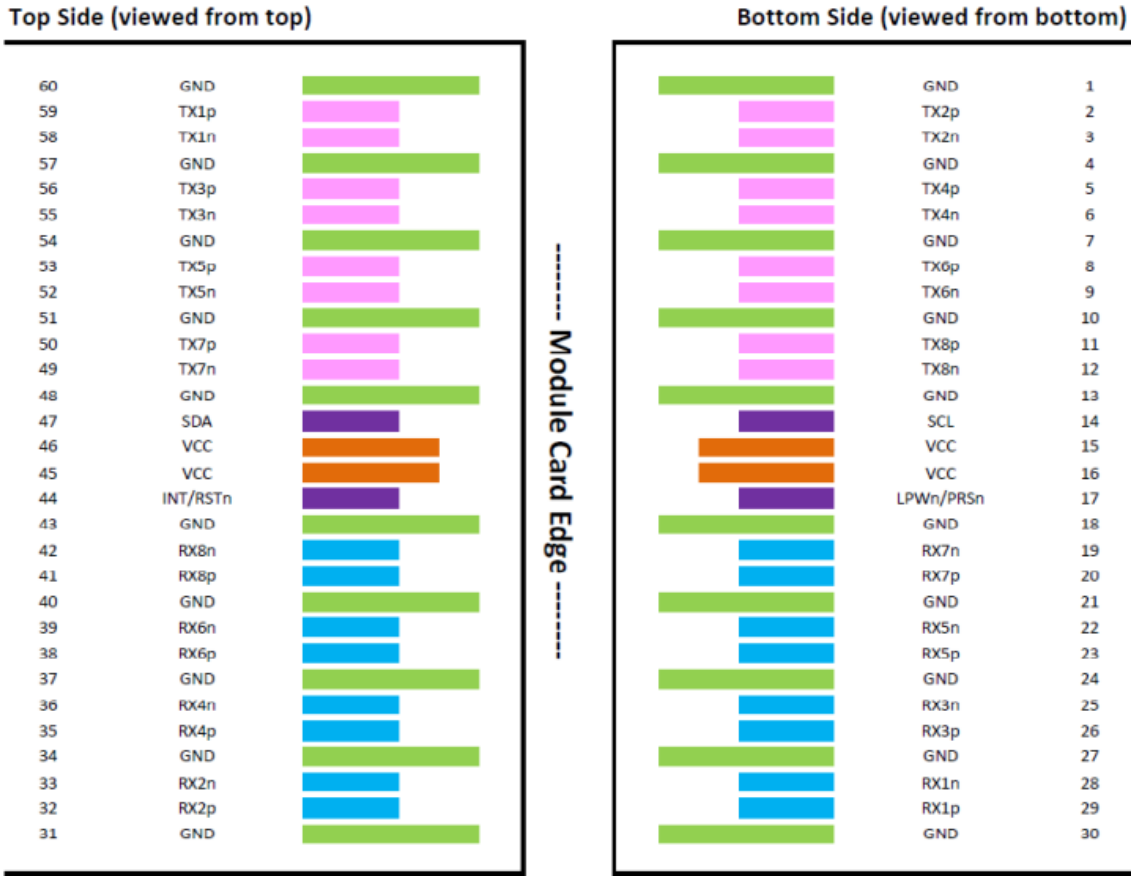
Pin	Logic	Symbol	Name/Description	Plug Sequence	Notes
1		GND	Module Ground.	1	1
2	CML-I	Tx2+	Transmitter Non-Inverted Data.	3	
3	CML-I	Tx2-	Transmitter Inverted Data.	3	
4		GND	Module Ground.	1	1
5	CML-I	Tx4+	Transmitter Non-Inverted Data.	3	
6	CML-I	Tx4-	Transmitter Inverted Data.	3	
7		GND	Module Ground.	1	1
8	CML-I	Tx6+	Transmitter Non-Inverted Data.	3	
9	CML-I	Tx6-	Transmitter Inverted Data.	3	
10		GND	Module Ground.	1	1
11	CML-I	Tx8+	Transmitter Non-Inverted Data.	3	
12	CML-I	Tx8-	Transmitter Inverted Data.	3	
13		GND	Module Ground.	1	1
14	LVCMOS-I/O	SCL	2-Wire Serial Interface Clock.	3	2
15		Vcc	+3.3V Power Supply.	2	
16		Vcc	+3.3V Power Supply.	2	
17	Multi-Level	LPWn/PRSn	Low-Power Mode/Module Present.	3	
18		GND	Module Ground.	1	1
19	CML-O	Rx7-	Receiver Inverted Data.	3	
20	CML-O	Rx7+	Receiver Non-Inverted Data.	3	
21		GND	Module Ground.	1	1
22	CML-O	Rx5-	Receiver Inverted Data.	3	
23	CML-O	Rx5+	Receiver Non-Inverted Data.	3	
24		GND	Module Ground.	1	1
25	CML-O	Rx3-	Receiver Inverted Data.	3	
26	CML-O	Rx3+	Receiver Non-Inverted Data.	3	
27		GND	Module Ground.	1	1
28	CML-O	Rx1-	Receiver Inverted Data.	3	
29	CML-O	Rx1+	Receiver Non-Inverted Data.	3	
30		GND	Module Ground.	1	1
31		GND	Module Ground.	1	1
32	CML-O	Rx2+	Receiver Non-Inverted Data.	3	
33	CML-O	Rx2-	Receiver Inverted Data.	3	
34		GND	Module Ground.	1	1
35	CML-O	Rx4+	Receiver Non-Inverted Data.	3	
36	CML-O	Rx4-	Receiver Inverted Data.	3	
37		GND	Module Ground.	1	1

38	CML-O	Rx6+	Receiver Non-Inverted Data.	3	
39	CML-O	Rx6-	Receiver Inverted Data.	3	
40		GND	Module Ground.	1	1
41	CML-O	Rx8+	Receiver Non-Inverted Data.	3	
42	CML-O	Rx8-	Receiver Inverted Data.	3	
43		GND	Module Ground.	1	1
44	Multi-Level	INT/RSTn	Module Input/Module Reset.	3	
45		Vcc	+3.3V Power Supply.	2	
46		Vcc	+3.3V Power Supply.	2	
47	LVCMOS-I/O	SDA	2-Wire Serial Interface Data.	3	2
48		GND	Module Ground.	1	1
49	CML-I	Tx7-	Transmitter Inverted Data.	3	
50	CML-I	Tx7+	Transmitter Non-Inverted Data.	3	
51		GND	Module Ground.	1	1
52	CML-I	Tx5-	Transmitter Inverted Data.	3	
53	CML-I	Tx5+	Transmitter Non-Inverted Data.	3	
54		GND	Module Ground.	1	1
55	CML-I	Tx3-	Transmitter Inverted Data.	3	
56	CML-I	Tx3+	Transmitter Non-Inverted Data.	3	
57		GND	Module Ground.	1	1
58	CML-I	Tx1-	Transmitter Inverted Data.	3	
59	CML-I	Tx1+	Transmitter Non-Inverted Data.	3	
60		GND	Module Ground.	1	1

Notes:

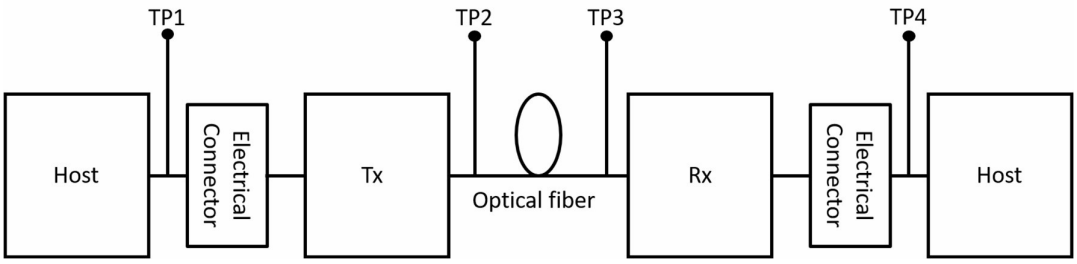
1. OSFP uses common ground (GND) for all signals and supply (power). All are common within the OSFP module, and all module voltages are referenced to this potential unless otherwise noted.
2. Open-Drain with pull-up resistor on the host.

Electrical Pad Layout

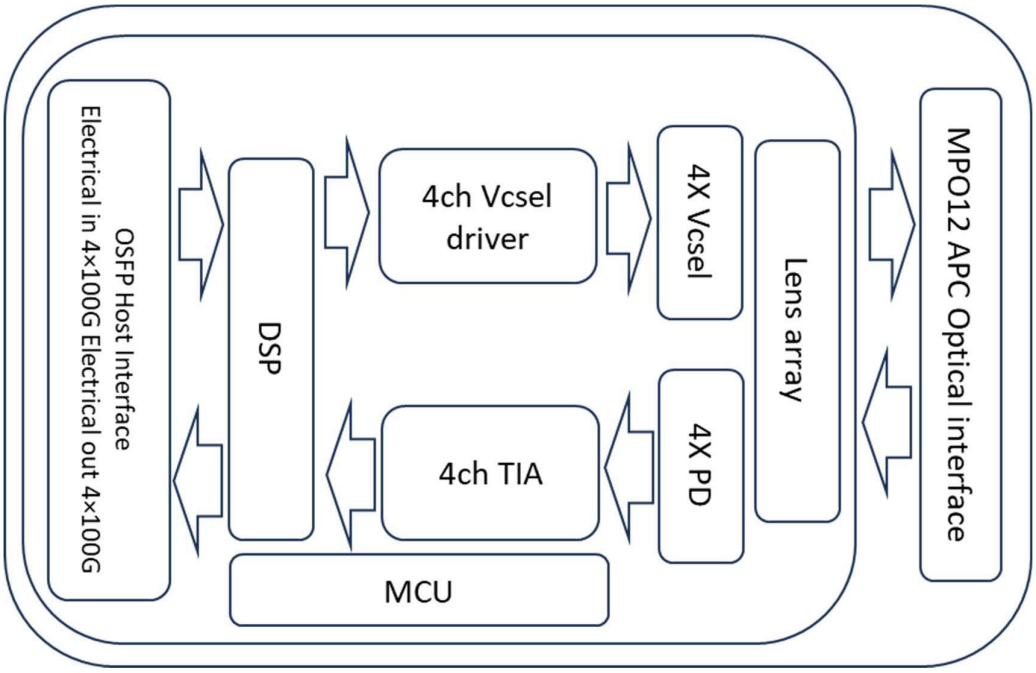


Test Compliance Points

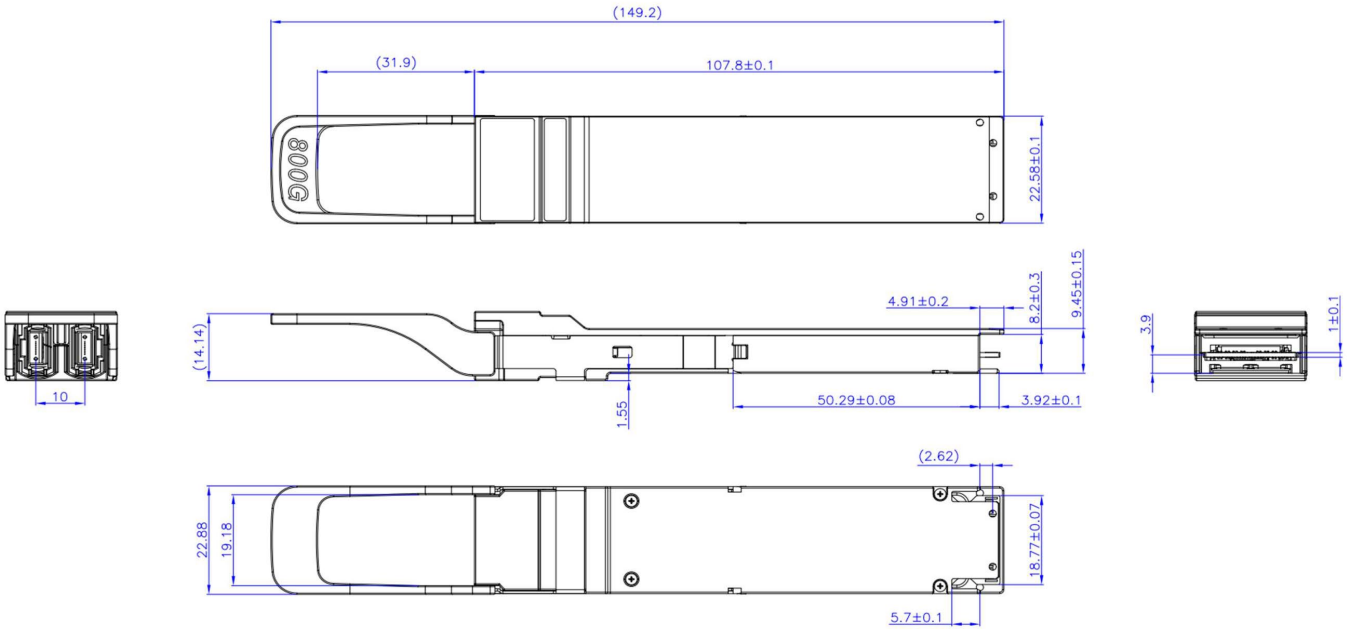
Reference link model and test compliance points used in product specifications are illustrated as follows.



Transceiver Block Diagram



Mechanical Specifications



About ProLabs

Our extensive experience comes as standard. For over 20 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with more than 100 optical switching and transport platforms.

A Complete Portfolio of Network Solutions

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 1.6T while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

The Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure compatible products, and immediate answers to your questions. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.

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