

Technical Datasheet

MMA1T00-HS-C

NVIDIA Mellanox® Compatible 200GBase-SR4 QSFP56 Transceiver

Hot Pluggable, +3.3V, MPO-12 Connector, 850nm, MMF, up to 100m, DOM,
Commercial Temperature

FEATURES

- Hot-pluggable QSFP56 footprint
- Support 212.5Gbps aggregate bit rate
- 4x56Gbps PAM4 850nm VCSEL transmitter
- 4x56Gbps electrical interface
- Maximum link length of 100m on OM4 MMF
- Power Dissipation <5.5W
- Single +3.3V power supply
- Single MPO12 receptacle
- Commercial Operating Temperature Range: 0°C to 70°C
- RoHS-6 compliant
- Compliant with SFF-8679
- Compliant with CMIS 4.0
- Compliant with IEEE 802.3cd 200GBASE-SR4

APPLICATIONS

- 200GBASE-SR4 Ethernet
- Data Center
- Other Optical Links

DESCRIPTION

ATGBICS® MMA1T00-HS transceiver is designed for use in 200Gb/s data rate over multi-mode fiber. The transceiver is compliant with SFF-8679, and the mechanical QSFP56 plug is compatible with SFF-8661. Digital diagnostics functions are available via a 2-wire serial interface, as specified in CMIS 4.0.

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Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Power Supply Voltage	VCC	0		3.6	V	
Storage Temperature	Ts	-40		+85	°C	
Relative Humidity	RH	5		85	%	Non-condensing
Case Operating Temperature	Tc	0		+70	°C	

Electric Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Power Supply Voltage	VCC	3.135	3.3	3.465	V	
Power Dissipation	PD			5.5	W	
Power Supply Current	Icc			1.75	A	
Aggregate Data Rate			212.5		Gbps	PAM4
Signaling rate per lane			56.125		Gbps	PAM4
Clock Rate-I2C				400	kHz	
Transmitter						
Input Differential impedance	ZIN		100		ohm	
Differential data input swing	VIN	180		900	mV	
Single-ended voltage tolerance		-0.3		3.3	V	
Receiver						
Output Differential impedance	Zout		100		ohm	
Differential data Output Swing	Vout	300		850	mV	

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Optical Parameters

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Power budget (for max TDECQ)		6.5			dB	
Modulation format			PAM4			
Signaling rate per lane			26.5625		GBd	
Transmitter						
Center Wavelength	λ	840	850	860	nm	
RMS spectral width	$\Delta\lambda_{RMS}$			0.6	nm	
Average Optical Power, each lane	PAVG	-6.5		4	dBm	
Outer Optical Modulation Amplitude (OMA _{outer}), each lane		-4.5		3	dBm	
Laser Off Power, each lane	POFF			-30	dBm	
Extinction Ratio, each lane		3			dB	
Transmitter and dispersion eye closure for PAM4 (TDECQ), each lane				4.5	dB	
TDECQ – 10log ₁₀ (Ceq) _c , each lane				4.5	dB	
Optical Return Loss Tolerance	ORL			12	dB	
Receiver						
Center Wavelength	λ	840	850	860	nm	
Average receive power, each lane		-8.4		4	dBm	
Receive power, each lane(OMA _{outer})				3	dBm	
Receiver Sensitivity (OMA _{outer}) each lane	RS=Max(-6.5, SECQ-7.9)				dBm	
Stressed Receiver Sensitivity (OMA _{outer}) each lane				-3.4	dBm	
Conditions of stressed receiver sensitivity test						
Stressed eye closure for PAM4 (SECQ), lane under test		4.5			dB	
SECQ-10log ₁₀ (Ceq) _f , lane under test		4.5			dB	
OMA _{outer} of each aggressor lane		3			dBm	
Damage threshold, each lane		5			dBm	
Los Assert	LOSA	-30		-10	dBm	
Los Dessert	LOSD			-9	dBm	
Los Hysteresis	LOSH	0.5			dB	
Receiver Reflectance	RREFL			-12	dB	

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General Specifications

Parameter		Symbol	Min.	Typical	Max.	Unit	Note
Aggregate Data Rate				212.5		Gbps	PAM4
Signaling rate per lane				56.125		Gbps	PAM4
Bit Error Ratio (pre-FEC)		BER			2.4E-4		PRBS31
Maximum Supported Distances							
Fiber Type	Bandwidth (850nm)						
50um	2000MHz*km				70	m	OM3
50um	4700MHz*km				100	m	OM4

Digital Diagnostic Functions

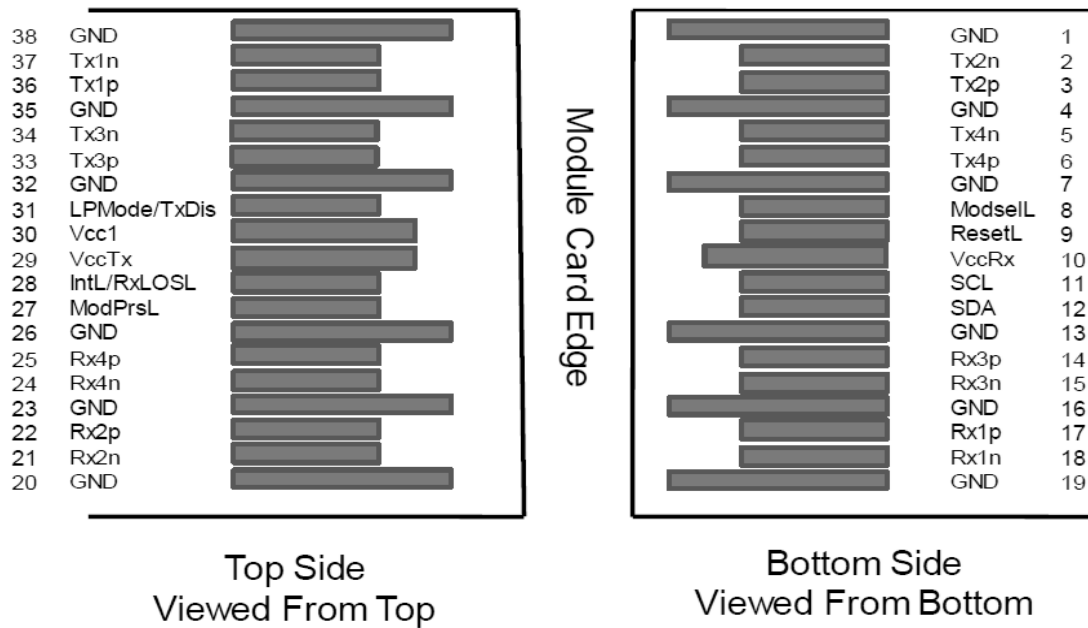
This transceiver can be used in host systems that require either internally or externally calibrated digital diagnostics.

Parameter		Symbol	Min.	Typical	Max.	Unit	Note
Temperature monitor absolute error			-3		3	°C	
Laser power monitor absolute error			-3		3	dB	
RX power monitor absolute error			-3		3	dB	
Supply voltage monitor absolute error			-100		100	mV	
Bias current monitor			-10%		10%	mA	

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Pin Assignment

Diagram of Host Board Connector Block Pin Numbers and Name



Pin Descriptions

PIN	Symbol	Name / Description	Note
1	GND	Ground	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	1
8	ModSelL	Module Select	2
9	ResetL	Module Reset	
10	Vcc Rx	3.3V Power Supply Receiver	
11	SCL	2-wire serial interface clock	3
12	SDA	2-wire serial interface data	3
13	GND	Ground	1
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	1

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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	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	1
27	ModPrsL	Module Present	3
28	IntL	Interrupt	3
29	Vcc Tx	3.3V power supply transmitter	
30	Vcc1	3.3V power supply	
31	LPMODE	Low Power Mode	
32	GND	Ground	1
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	1
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	1

Note1: Module ground pins GND are isolated from the module case.

Note2: ModSelL is an input signal. When held low by the host, the module responds to two-wire serial communication commands. The ModSelL signal allows the use of multiple modules on a single two-wire interface. When ModSelL is high, the module shall not respond to or acknowledge any two-wire interface communication from the host.

Note3: Shall be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.45V on the host board.

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Mechanical Dimensions

Unit: mm

