MAM1Q00A-QSA NVIDIA DynamiX QSA™, QSFP+ to SFP+ Adapter Product Specifications

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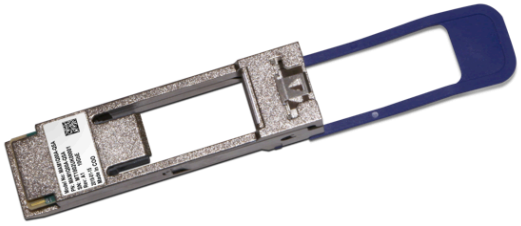
Introduction

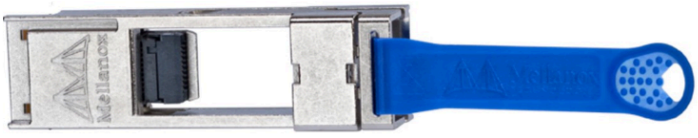
NVIDIA® DynamiX QSA™, QSFP+ to SFP+ adapter, enables smooth, cost effective connections between a single lane transceiver/cable and a quad lane port. The QSA provides the option to connect an SFP+/SFP transceiver or cable to a QSFP+ port of a Nx40GbE switch or network interface card (NIC).

The QSA should be installed into a QSFP+ port and is intended to either connect a switch QSFP+ port to a NIC SFP port or connect a NIC QSFP+ port to a switch SFP port. For example, an SFP-based cable can be connected to 40GbE ConnectX®-3 NIC and to the 48 x 10GbE SX1012 Ethernet switch. The QSA conforms to the SFF-8418/8419 for the SFP side and to SFF-8436 for the QSFP+ standards and is thoroughly tested to meet strict quality requirements. The adapter has a QSFP+ form factor with a receptacle for SFP+ transceiver/AOC/DAC connector. The QSA provides a solution for integrating systems using different vendors' equipment, it is vendor agnostic and provides a direct path to the SFP unit's memory. The QSA interoperates with all major optical module and direct attach copper cables vendors.

Its design assures minimum loss on the conversion path between the QSFP+ cage and the SFP receptacle. The RF (high speed data) channel of the SFP receptacle is connected to lane 1 of the QSFP+ connector. The 3 remaining RF channels on the QSFP+ connector are not connected. The QSA is qualified for 10GbE SFP+ and 1GbE SFP transceivers meeting the Small Form Factor Pluggable (SFP)
Transceiver Multi-source Agreement (MSA).

Option 1 Option 2





⚠ Warning

Images are for illustration purposes only. Product labels, colors, and lengths may vary.

Key Features

- Industry-leading price and performance
- Trouble-free installation and network bring-up
- Compliant to industry standards
    - QSFP+ MSA SFF-8436
    - SFP+ MSA SFF-8418/8419
- Low insertion loss
- Registered US patent 7,934,959
- Matched impedance
- Secure latching mechanism
- RoHS compliant

Pin Descriptions

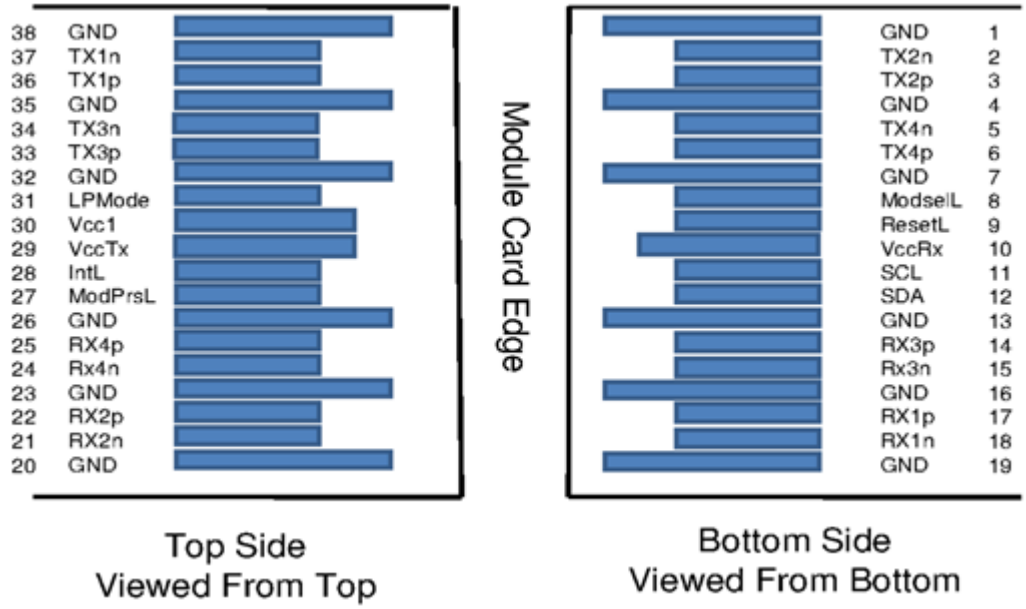
The QSFP+ is SFF-8679 compliant.

QSFP+ Pin Description

Pin	Symbol	Description	Pin	Symbol	Description
1	GND	Ground	20	GND	Ground
2	Tx2n	Transmitter Inverted Data Input	21	Rx2n	Receiver Inverted Data Output
3	Tx2p	Transmitter Non-Inverted Data Input	22	Rx2p	Receiver Non-Inverted Data Output
4	GND	Ground	23	GND	Grounds
5	Tx4n	Transmitter Inverted Data Input	24	Rx4n	Receiver Inverted Data Output
6	Tx4p	Transmitter Non-Inverted Data Input	25	Rx4p	Receiver Non-Inverted Data Output
7	GND	Ground	26	GND	Ground
8	ModSelL	Module Select	27	ModPrsL	Module Present
9	ResetL	Module Reset	28	IntL	Interrupt
10	Vcc Rx	+3.3V Power Supply Receiver	29	Vcc Tx	+3.3V Power Supply Transmitter
11	SCL	2-wire Serial Interface Clock	30	Vcc1	+3.3V Power Supply
12	SDA	2-wire Serial Interface Data	31	LPMode	Low Power Mode
13	GND	GND	32	GND	Ground

Pin	Symbol	Description	Pin	Symbol	Description
14	Rx3p	Receiver Non-Inverted Data Output	33	Tx3p	Transmitter Non-Inverted Data Input
15	Rx3n	Receiver Inverted Data Output	34	Tx3n	Transmitter Inverted Data Input
16	GND	Ground	35	GND	Ground
17	Rx1p	Receiver Non-Inverted Data Output	36	Tx1p	Transmitter Non-Inverted Data Input
18	Rx1n	Receiver Inverted Data Output	37	Tx1n	Transmitter Inverted Data Input
19	GND	Ground	38	GND	Ground

QSFP+ Module Pad Layout



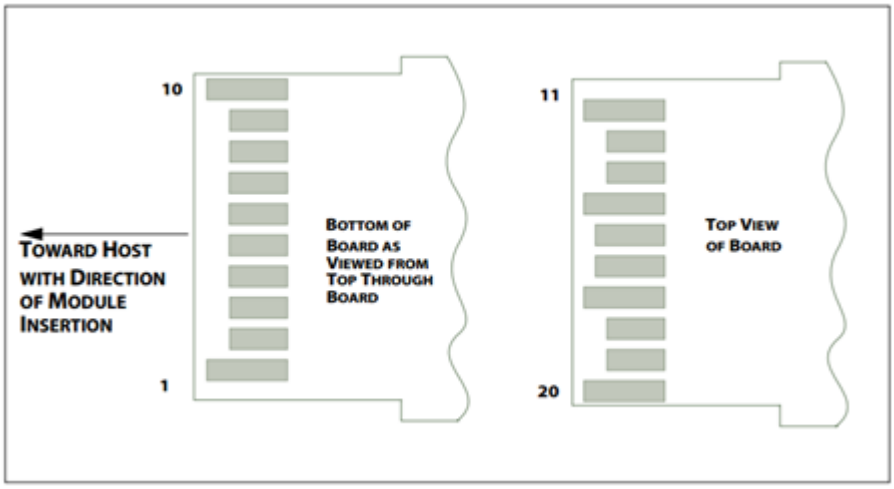
SFP Pin Description

The SFP pin assignment is SFF-8419 compliant.

SFP Pin Description

Pin	Connector Pin Name	Port A Signal Name
1	VeeT	Module Transmitter Ground
2	Tx_Fault	Module Transmitter Fault
3	Tx_Disable	Transmitter Disable. Turns off transmitter laser output
4	SDA	2-wire Serial Interface Data Line
5	SCL	2-wire Serial Interface Clock
6	Mod_ABS	Module Absent. Grounded within the module
7	RS0	Rate Select 0, optionally controls SFP+ module receiver
8	Rx_LOS	Receiver Loss of Signal Indication
9	RS1	Rate Select 1, optionally controls SFP+ module transmitter
10	VeeR	Module Receiver Ground
11	VeeR	Module Receiver Ground
12	RD-	Receiver Inverted Data Output
13	RD+	Receiver Non-Inverted Data Output
14	VeeR	Module Receiver Ground
15	VccR	Module Receiver Power Supply
16	VccT	Module Transmitter Power Supply
17	VeeT	Module Transmitter Ground
18	TD+	Transmitter Non-Inverted Data Input. AC coupled
19	TD-	Transmitter Inverted Data Input. AC coupled
20	VeeT	Module Transmitter Ground

SFP Module Pad Layout



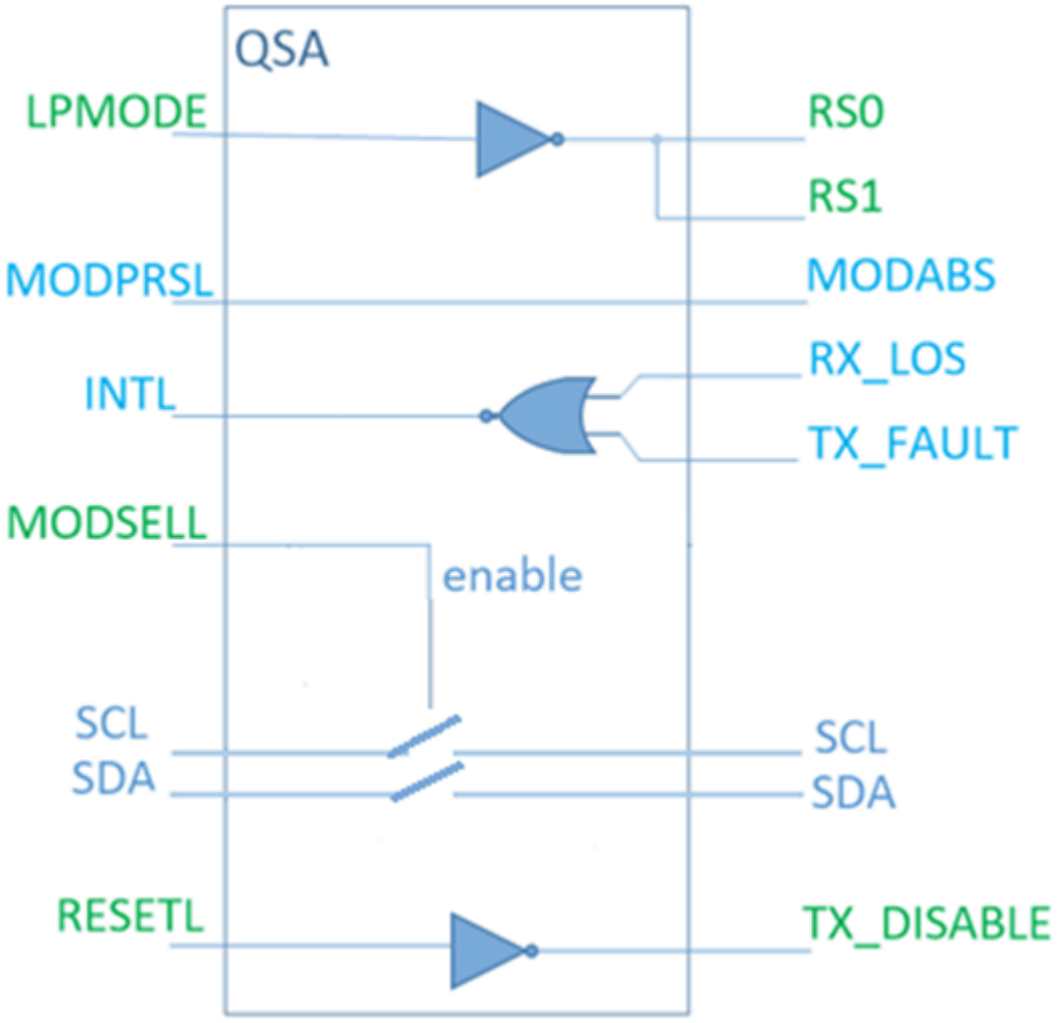
SFP to QSFP Pin Description

The below details the status/control signals interconnection between QSFP and the SFP connectors.

SFP to QSFP Status/Control Signals

QSFP Signal	SFP Signal	Description of Function
ModPrsL	ModAbs	Connected to Vee inside the SFP transceiver.
IntL	Rx_LOS	Inverted logic: IntL = Rx_LOS OR Tx_FAULT
	Tx_Fault	
ModSelL		Used for encoding of the mutual exclusive SCL/SDA switch enable logic as shown below.
LPMode	RS0	Inverted logic: RS0 = RS1 = NOT LPMode
	RS1	
ResetL	Tx_Disable	Inverted logic: Tx_Disable = NOT ResetL
SCL	SCL	Connected to mutual exclusive bidirectional switches using the encoding shown in below.
SDA	SDA	Connected to mutual exclusive bidirectional switches using the encoding shown in below.

SFP to QSFP (Patented U.S. Pat. 7,934,959)



Specifications

Absolute Maximum Specifications

Absolute maximum ratings are those beyond which the device may be damaged.

Parameter	Min	Max	Units
Supply voltage	-0.3	3.6	V
Data input voltage	-0.3	3.6	V
Control input voltage	-0.3	3.6	V

Environmental Specifications

This table shows the environmental specifications for the product.

Parameter	Min	Max	Units
Storage temperature	-40	85	°C

Operational Specifications

This section shows the range of values for normal operation.

Parameter	Min	Typ	Max	Units
Supply voltage (V_{cc})	3.135	3.3	3.465	V
Power consumption	---	---	0.1	W
Operating case temperature	0		70	°C

Parameter	Min	Typ	Max	Units
Operating case temperature for MAM1Q00A-QSA_E	-10		85	°C
Operating relative humidity	5		85	%

Electrical Specifications

Parameter	Min	Typ	Max	Units
Characteristic Impedance	90	100	110	Ω

Electrostatic Discharge (ESD)

This product is compatible with ESD levels in typical data center operating environments and certified in accordance with the standards listed in the Regulatory Compliance Section. The product is shipped with protective caps on all connectors to protect it during shipping. In normal handling and operation of high-speed cables and optical transceivers, ESD is of concern during insertion into the OSFP cage of the server/switch. Hence, standard ESD handling precautions must be observed. These include use of grounded wrist/shoe straps and ESD floor wherever a cable/transceiver is extracted/inserted. Electrostatic discharges to the exterior of the host equipment chassis after installation are subject to system level ESD requirements.

Mechanical Specifications

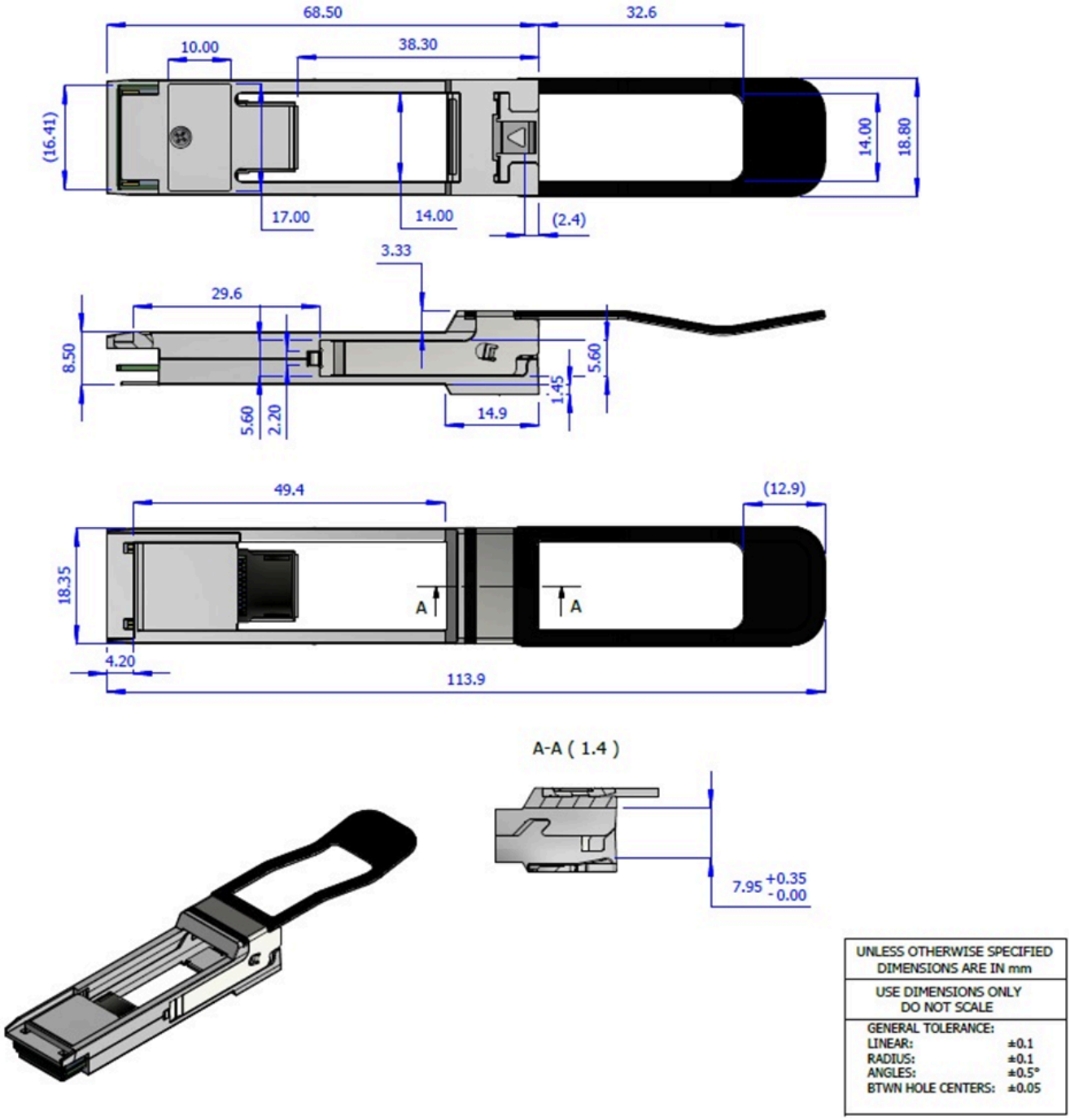
The figure below shows the dimensions of the QSA.

⚠ Warning

The SFP+/SFP mating paddle card dimension A10 (length of component/solder mask keep-out area, refer to SFF-8071) shall be >6.0mm instead of >5.5mm. The reason for this requirement is to

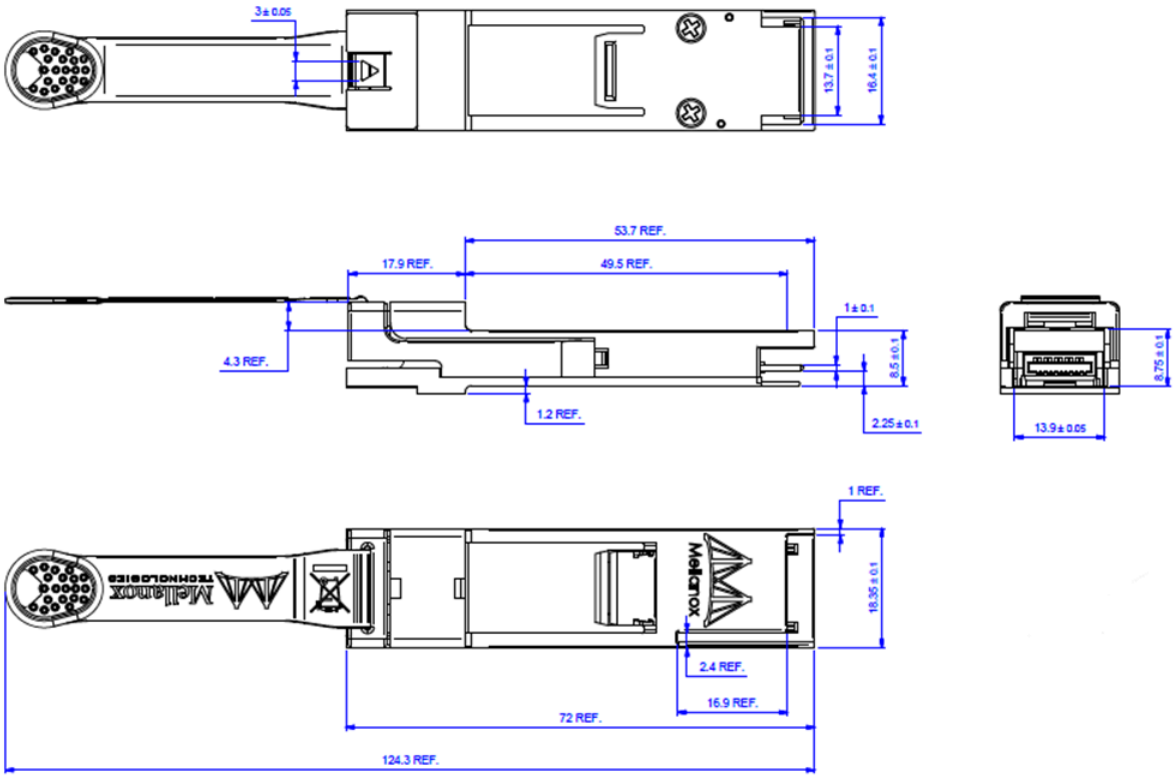
prevent damaging the adapter when trying to insert an SFP upside down.

Mechanical Dimensions (Option 1)



> **⚠ Warning**
>
> Dimensions provided in parenthesis are informative only and not a controlled dimension

Mechanical Dimensions (Option 2)



RF Connectivity

QSFP+ Side	SFP/SFP+ Side
TX1	TX1
RX1	RX1
TX2	Terminated

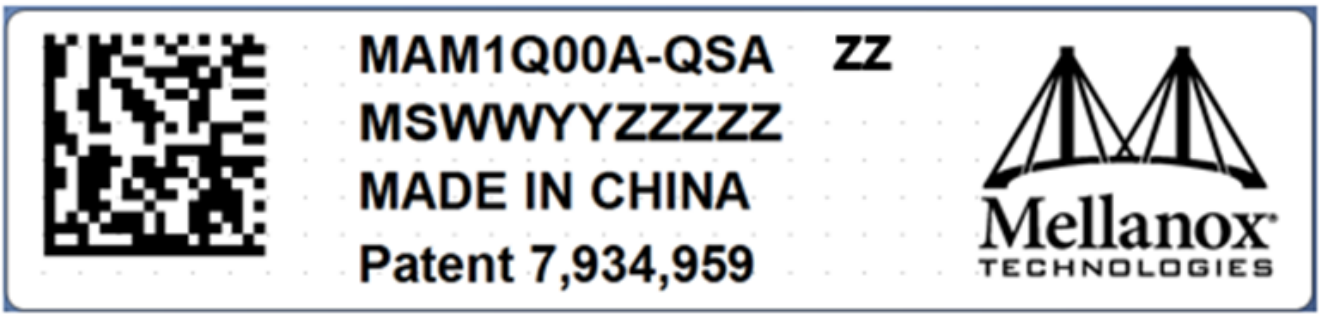
QSFP+ Side	SFP/SFP+ Side
RX2	Terminated
TX3	Terminated
RX3	Terminated
TX4	Terminated
RX4	Terminated

Labels

The following label is applied on the cable's backshell:

(sample illustration)

The following label is applied on the adapter's pull-tab for option 2:



Legend: COO – Country of Origin

Backshell Label SN (Serial Number) Legend

Symbol	Meaning	Notes
SN – Serial Number		
MT/MS	Manufacturer name	2 characters, e.g. MT
YY	Year of manufacturing	2 digits
WW	Week of manufacturing	2 digits
XX	Manufacturer site	2 characters
SSSSS	Serial number	5 digits for serial number, starting from 00001. Reset at start of week to 00001.
Miscellaneous		
ZZ	HW and SW revision	2 alpha-numeric characters
YYYY	Year of manufacturing	4 digits
MM	Month of manufacturing	2 digits
DD	Day of manufacturing	2 digits
COO	Country of origin	E.g. China or Malaysia

Symbol	Meaning	Notes
	Quick response code	Serial number (MTYYWWXXSSSSS)

Regulatory Compliance and Classification

- Safety: CB, CE
- EMC: CE, FCC, ICES, RCM

Ask your NVIDIA FAE for a zip file of the certifications for this product.

FCC Class A Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Document Revision History

Revision	Date	Description
2.4	Aug. 2022	Reformatted and rebranded; migrated to HTML.
2.3	Nov. 2020	Updated COO definition in the Back-shell Label Option 1 Legend table.
2.2	Oct. 2020	Updated the Table 10: Back-shell Label Option 1 Legend.
2.1	Sep. 2020	Updated Figure 5: QSA28 Mechanical Drawing. The additional information is elaborated in the new note below the figure.
2.0	Aug. 2020	Added SFP to QSFP Pin Description.
1.9	Jul. 16, 2018	2.5 Mechanical Specifications, page 11 – Added note about paddle card. Table 10: Back-shell Label Option 1 Legend, page 13 – Minor changes. Table 11: Pull-tab Label Option 2 Legend, page 13 – Minor changes.
1.8	Jun. 18, 2018	Figure 5: QSA Mechanical Drawing Option 1, page 11 – Changed SFP+ clearance length from 37.5 to 38.3mm. 2.6 Labels, page 12 – Added option 2 label
1.7	May 24, 2018	Table 12: Ordering Part Number and Description, page 15 – Changed to Added MAM1Q00A-QSA_E.
1.6	May 23, 2018	Table 7: Operational Specifications, page 10 – Added Operating case temperature for MAM1Q00A-QSA_E. Table 12: Ordering Part Number and Description, page 15 - Added MAM1Q00A-QSA_E.
1.5	Mar. 21, 2018	Figure 5: QSA Mechanical Drawing Option 1, page 11 – Updated.
1.4	Jan. 29, 2018	New document format. Figure 1: MAM1Q00A-QSA, page 1 – New option 1 photo.

Revision	Date	Description
		2 Specifications, page 10 – Updated, added Mechanical Specifications Option 1. 2.7 Regulatory Compliance and Classification, page 14 – New section
1.3	Dec. 2015	Edited Product Label (figure 5).
1.2	Oct. 2015	Edited Introduction.
1.1	Mar. 2015	Edited Overview and Features. Added Table 4.
1.0	Apr. 2014	Initial release.