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INTERCONNECT
PRODUCT BRIEF



56Gb/s and 40GbE QSFP+ Direct Attach Copper Cables

MC22061xx-00x | MC22071xx-0xx | MC22101xx-00x | MCP170L-F0xx | MCP1700-B0xxx

Mellanox® QSFP+ direct attach copper (DAC) cables provide robust connections for leading edge 56Gb/s InfiniBand or 40GbE Ethernet systems. The cables consist of four lanes each operating at data rates of up to 14.0625Gb/s.

Passive copper cables require no additional power to ensure quality connectivity. The cables are compliant with SFF-8685 specifications and provide connectivity between devices using QSFP+ ports. Each QSFP+ port comprises an EEPROM providing product information, which can be read by the host system.

This integrated cable solution provides reliable transport for aggregate data rates of up to 56Gb/s Virtual Protocol Interconnect (VPI). Optimizing systems to operate with Mellanox's 56Gb/s passive copper cables significantly reduces power consumption and EMI emission, eliminating the use of enterprise data center (EDC) hosts.

Mellanox's unique quality passive copper cable solutions provide power-efficient connectivity for short distance interconnects. They enable higher port bandwidth, density and configurability at a low cost and reduced power requirement in the data centers.

Rigorous cable production testing ensures best out-of-the-box installation experience, performance and durability.

HIGHLIGHTS

- Up to 56Gb/s data rate for MC22071xx, MCP170L
- Up to 40Gb/s data rate for MC22061xx, MC22101xx, MCP1700
- SFF-8685 compliant QSFP+
- Operating case temperature of 0-70°C
- 3.3V power supply
- BER better than 1E-15
- Hot pluggable
- RoHS compliant
- SFF-8636 compliant I²C management interface

Table 1 - Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply voltage	-0.3	3.6	V
Data input voltage	-0.3	3.6	V
Control input voltage	-0.3	3.6	V

Table 2 - Operational Specifications

Parameter	Minimum	Typical	Maximum	Units
Supply voltage (Vcc)	3.135	3.3	3.465	V
Power consumption	---	---	0.1	W
Operating case temperature	0	---	70	°C
Operating relative humidity	5	---	85	%

Table 3 - Electrical Specifications

Parameter	Minimum	Typical	Maximum	Units
Characteristic impedance	90	100	110	Ω
Time propagation delay (informative)	---	---	4.5	ns/m

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Table 4 - Cable Mechanical Specifications

Ordering Part Number	Length (m)	Gauge	Max Cable Diameter (mm)	Min. Single Bending Radius (mm)	Min. Assembly/ Repeated Bending Radius (mm)	Min. Bending Space (mm)
MC2206130-00A	0.5 ± 0.025	30	6.3	31	63	119
MC2206130-001	1.0 ± 0.035	30	6.3	31	63	119
MC2206130-002	2.0 ± 0.060	30	6.3	31	63	119
MC2206130-003	3.0 ± 0.100	30	6.3	31	63	119
MC2206128-004	4.0 ± 0.100	28	7.4	37	74	131
MC2206128-005	5.0 ± 0.100	28	7.4	37	74	131
MC2206126-006	6.0 ± 0.700	26	9.6	48	96	151
MC2206125-007	7.0 ± 0.800	26	9.6	48	96	151
MC2207130-00A	0.5 ± 0.025	30	6.3	31	63	119
MC2207130-001	1.0 ± 0.035	30	6.3	31	63	119
MC2207130-0A1	1.5 ± 0.06	30	6.3	31	63	118
MC2207130-002	2.0 ± 0.060	30	6.3	31	63	119
MC2207128-0A2	2.5 ± 0.100	28	7.5	37	75	130
MC2207128-003	3.0 ± 0.100	28	7.4	37	74	131
MC2207126-004	4.0 ± 0.100	26	9.6	49	96	154
MCP170L-F00A	0.5 ± 0.025	30	6.9	34	69	124
MCP170L-F001	1.0 ± 0.035	30	6.9	34	69	124
MCP170L-F01A	1.5 ± 0.060	30	6.9	34	69	124
MCP170L-F002	2.0 ± 0.060	30	6.9	34	69	124
MCP170L-F003	3.0 ± 0.100	28	7.9	39	79	134
MCP1700-B001E*	1.0 ± 0.035	30	6.3	31	63	118
MCP1700-B01AE*	1.5 ± 0.06	30	6.3	31	63	118
MCP1700-B002E*	2.0 ± 0.06	30	6.3	31	63	118
MCP1700-B02AE*	2.5 ± 0.1	28	7.5	37	75	130
MCP1700-B003E*	3.0 ± 0.1	28	7.5	37	75	130
MC2210130-001	1.0 ± 0.035	30	6.3	31	63	118
MC2210130-002	2.0 ± 0.060	30	6.3	31	63	118
MC2210128-003	3.0 ± 0.100	28	7.4	37	74	129
MC2210126-004	4.0 ± 0.100	25	9.6	48	96	151
MC2210126-005	5.0 ± 0.100	25	9.6	48	96	151

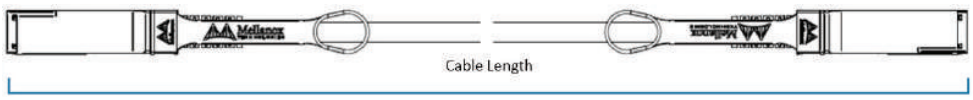
Note 1. See Figure 1 for the cable length definition.

Note 2: *The pulltab color is black, instead of the standard blue pulltab.

Note 3: The minimum bending space is the distance from the system panel to the edge of the cable bend with the minimum assembly bending radius. This corresponds to the distance from the switch panel to the rack door.

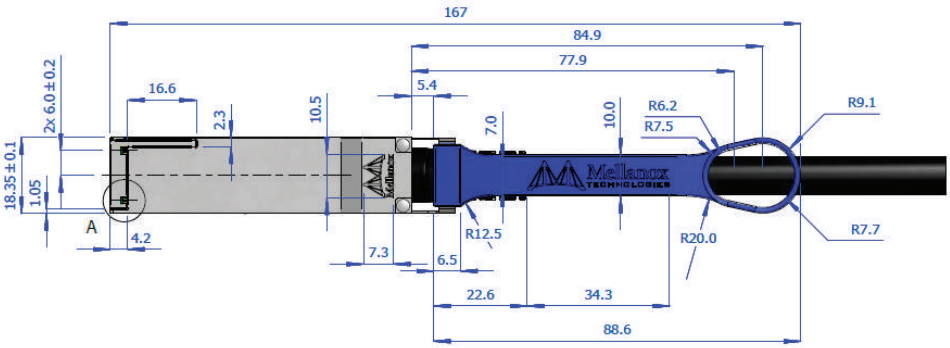
Note 4: The minimum assembly bending radius (close to the connector) is 10x the cable's outer diameter. The repeated bend (far from the connector) is also 10x the cable's outer diameter. The single bend (far from the connector) is 5x the cable's outer diameter.

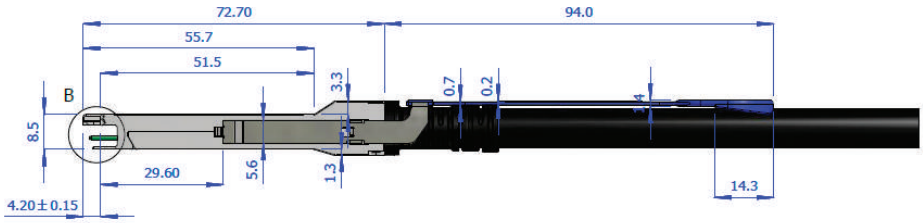
Figure 1. *Cable Length Definition*

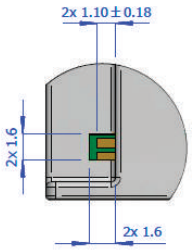


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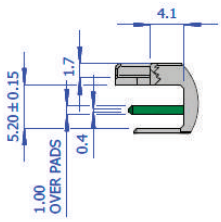
Mechanical Schematics



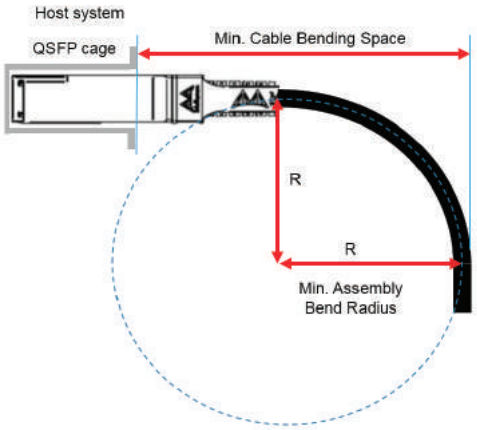




DETAIL A
SCALE 4 : 1



DETAIL B
SCALE 2 : 1



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Table 5 - Part Numbers and Descriptions

OPN	Description
MC2206130-00A	Mellanox® passive copper cable, VPI, up to 40 Gb/s, QSFP, 0.5m
MC2206130-001	Mellanox® passive copper cable, VPI, up to 40 Gb/s, QSFP, 1m
MC2206130-002	Mellanox® passive copper cable, VPI, up to 40 Gb/s, QSFP, 2m
MC2206130-003	Mellanox® passive copper cable, VPI, up to 40 Gb/s, QSFP, 3m
MC2206128-004	Mellanox® passive copper cable, VPI, up to 40 Gb/s, QSFP, 4m
MC2206128-005	Mellanox® passive copper cable, VPI, up to 40 Gb/s, QSFP, 5m
MC2206126-006	Mellanox® passive copper cable, IB QDR, 40 Gb/s, QSFP, 6m
MC2206125-007	Mellanox® passive copper cable, IB QDR, 40 Gb/s, QSFP, 7m
MC2207130-00A	Mellanox® passive copper cable, VPI, up to 56 Gb/s, QSFP, 0.5m
MC2207130-001	Mellanox® passive copper cable, VPI, up to 56 Gb/s, QSFP, 1m
MC2207130-0A1	Mellanox® passive copper cable, VPI, up to 56 Gb/s, QSFP, 1.5m
MC2207130-002	Mellanox® passive copper cable, VPI, up to 56 Gb/s, QSFP, 2m
MC2207128-0A2	Mellanox® passive copper cable, VPI, up to 56 Gb/s, QSFP, 2.5m
MC2207128-003	Mellanox® passive copper cable, VPI, up to 56 Gb/s, QSFP, 3m
MC2207126-004	Mellanox® passive copper cable, VPI, up to 56 Gb/s, QSFP, 4m
MCP170L-F00A	Mellanox® passive copper cable, VPI, up to 56 Gb/s, QSFP, LSZH, 0.5m
MCP170L-F001	Mellanox® passive copper cable, VPI, up to 56 Gb/s, QSFP, LSZH, 1m
MCP170L-F01A	Mellanox® passive copper cable, VPI, up to 56 Gb/s, QSFP, LSZH, 1.5m
MCP170L-F002	Mellanox® passive copper cable, VPI, up to 56 Gb/s, QSFP, LSZH, 2m
MCP170L-F003	Mellanox® passive copper cable, VPI, up to 56 Gb/s, QSFP, LSZH, 3m
MCP1700-B001E	Mellanox® passive copper cable, ETH 40GbE, 40Gb/s, QSFP, 1m, Black Pulltab
MCP1700-B01AE	Mellanox® passive copper cable, ETH 40GbE, 40Gb/s, QSFP, 1.5m, Black Pulltab
MCP1700-B002E	Mellanox® passive copper cable, ETH 40GbE, 40Gb/s, QSFP, 2m, Black Pulltab
MCP1700-B02AE	Mellanox® passive copper cable, ETH 40GbE, 40Gb/s, QSFP, 2.5m, Black Pulltab
MCP1700-B003E	Mellanox® passive copper cable, ETH 40GbE, 40Gb/s, QSFP, 3m, Black Pulltab
MC2210130-001	Mellanox® passive copper cable, ETH 40GbE, 40Gb/s, QSFP, 1m
MC2210130-002	Mellanox® passive copper cable, ETH 40GbE, 40Gb/s, QSFP, 2m
MC2210128-003	Mellanox® passive copper cable, ETH 40GbE, 40Gb/s, QSFP, 3m
MC2210126-004	Mellanox® passive copper cable, ETH 40GbE, 40Gb/s, QSFP, 4m
MC2210126-005	Mellanox® passive copper cable, ETH 40GbE, 40Gb/s, QSFP, 5m

Note: The standard pulltab color is blue; cables with a black pulltab are indicated accordingly.

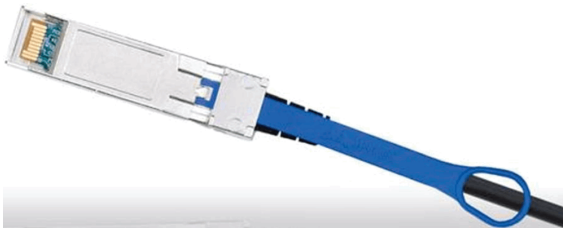
Warranty Information

Mellanox LinkX direct attach copper cables include a 1 year limited hardware warranty, which covers parts repair or replacement.

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Rev 2.4



10GbE SFP+ Direct Attach Copper Cables

LinkX™ CABLES TRANSCEIVERS COMPONENTS †

MC33091xx-xxx | MCP210x-XxxxB

Mellanox® SFP+ direct attached copper (DAC) cables provide robust connections for leading edge 10GbE systems. Passive copper cables require no additional power to ensure quality connectivity. The cables are compliant with SFF-8418 and SFF-8419 specifications and provide connectivity between devices using SFP+ ports. The cables use state-of-the-art signal processing technology to fill the expanding need for cost effective data center interconnects.

Mellanox unique, quality, passive, copper, cable solutions provide a power efficient replacement for active power connectivity such as fiber optic cables. Rigorous cable production testing ensures best out-of-the-box installation experience, performance and durability. Optimizing systems to operate with Mellanox's 10GbE passive copper cables significantly reduces power consumption and EMI emission, eliminating the use of enterprise data center (EDC) hosts.

Table 1 - Cable Specifications and Ordering Information

Max Reach (m)	Gauge (AWG)	Max Cable Diameter (mm)	Min Bulk Bend Radius (mm)	Min Assembly Bend Radius (mm)	Length Tolerance (mm)	Part Number
0.5	30	4.4	25	44	±15	MC3309130-00A
1					±25	MC3309130-001
1.5					±50	MC3309130-0A1
2					±50	MC3309130-002
3					±80	MC3309130-003
5	24	6.3	31	63	±80	MC3309124-005
7					±170	MC3309124-007

Notes: Both the bending radius and the assembly bending radius are for a single time bending. See Figure 1 for the cable length definition.
See Table 4 for the part number descriptions.

Table 2 - Operational Specifications

Parameter	Minimum	Typical	Maximum	Units
Supply voltage (VccR/VccT)	3.15	3.3	3.45	V
Operating case temperature	0	---	70	°C
Operating relative humidity	10	---	90	%
Storage temperature	-40	---	85	°C

HIGHLIGHTS

- Compliant with SFF-8418 and SFF-8419
- Up to 7m 10Gb/s data rates
- Ultra-low crosstalk for improved performance
- Low insertion loss
- BER better than 1E-15
- Serial numbers printed on each SFP+ connector
- Tested in an end-to-end system
- RoHS-6 compliant

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Mechanical Schematics

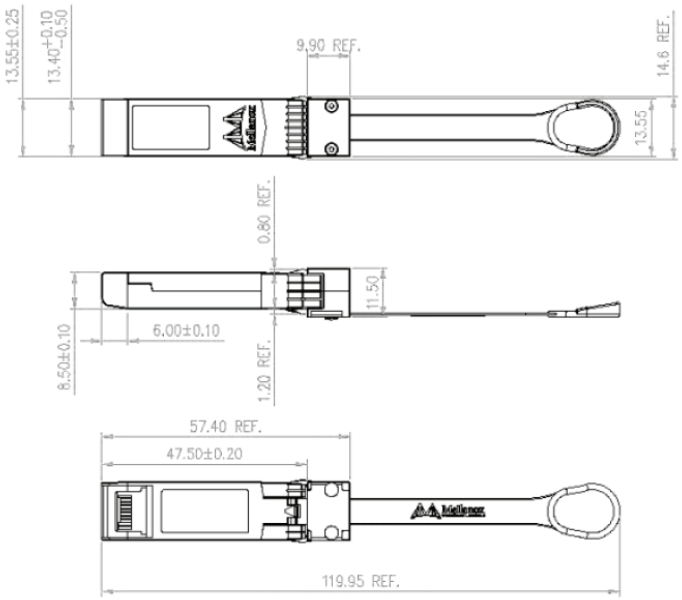


Figure 1. *Cable Length Definition*

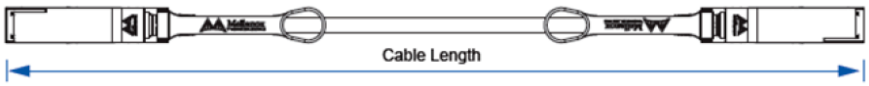


Table 3 - Part Numbers and Descriptions

OPN	Description
MC3309130-00A	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 0.5m, 30AWG
MC3309130-001	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 1m, 30AWG
MC3309130-0A1	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 1.5m, 30AWG
MC3309130-002	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 2m, 30AWG
MC3309130-003	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 3m, 30AWG
MC3309124-005	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 5m, 24AWG
MC3309124-007	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 7m, 24AWG
MCP2100-X00AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 0.5m, Blue Pulltab, Connector Label
MCP2100-X001B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 1m, Blue Pulltab, Connector Label
MCP2100-X01AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 1.5m, Blue Pulltab, Connector Label
MCP2100-X002B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 2m, Blue Pulltab, Connector Label
MCP2100-X02AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 2.5m, Blue Pulltab, Connector Label
MCP2100-X003B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 3m, Blue Pulltab, Connector Label
MCP2100-X03AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 3.5m, Blue Pulltab, Connector Label
MCP2100-X004B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 4m, Blue Pulltab, Connector Label
MCP2100-X04AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 4.5m, Blue Pulltab, Connector Label
MCP2100-X005B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 5m, Blue Pulltab, Connector Label
MCP2101-X00AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 0.5m, Green Pulltab, Connector Label
MCP2101-X001B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 1m, Green Pulltab, Connector Label
MCP2101-X01AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 1.5m, Green Pulltab, Connector Label
MCP2101-X002B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 2m, Green Pulltab, Connector Label
MCP2101-X02AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 2.5m, Green Pulltab, Connector Label

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Table 3 - Part Numbers and Descriptions (cont.)

OPN	Description
MCP2101-X003B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 3m, Green Pulltab, Connector Label
MCP2101-X03AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 3.5m, Green Pulltab, Connector Label
MCP2101-X004B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 4m, Green Pulltab, Connector Label
MCP2101-X04AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 4.5m, Green Pulltab, Connector Label
MCP2101-X005B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 5m, Green Pulltab, Connector Label
MCP2102-X00AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 0.5m, Red Pulltab, Connector Label
MCP2102-X001B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 1m, Red Pulltab, Connector Label
MCP2102-X01AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 1.5m, Red Pulltab, Connector Label
MCP2102-X002B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 2m, Red Pulltab, Connector Label
MCP2102-X02AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 2.5m, Red Pulltab, Connector Label
MCP2102-X003B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 3m, Red Pulltab, Connector Label
MCP2102-X03AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 3.5m, Red Pulltab, Connector Label
MCP2102-X004B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 4m, Red Pulltab, Connector Label
MCP2102-X04AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 4.5m, Red Pulltab, Connector Label
MCP2102-X005B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 5m, Red Pulltab, Connector Label
MCP2103-X00AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 0.5m, Yellow Pulltab, Connector Label
MCP2103-X001B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 1m, Yellow Pulltab, Connector Label
MCP2103-X01AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 1.5m, Yellow Pulltab, Connector Label
MCP2103-X002B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 2m, Yellow Pulltab, Connector Label
MCP2103-X02AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 2.5m, Yellow Pulltab, Connector Label
MCP2103-X003B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 3m, Yellow Pulltab, Connector Label
MCP2103-X03AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 3.5m, Yellow Pulltab, Connector Label
MCP2103-X004B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 4m, Yellow Pulltab, Connector Label
MCP2103-X04AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 4.5m, Yellow Pulltab, Connector Label
MCP2103-X005B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 5m, Yellow Pulltab, Connector Label
MCP2104-X00AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 0.5m, Black Pulltab, Connector Label
MCP2104-X001B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 1m, Black Pulltab, Connector Label
MCP2104-X01AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 1.5m, Black Pulltab, Connector Label
MCP2104-X002B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 2m, Black Pulltab, Connector Label
MCP2104-X02AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 2.5m, Black Pulltab, Connector Label
MCP2104-X003B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 3m, Black Pulltab, Connector Label
MCP2104-X03AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 3.5m, Black Pulltab, Connector Label
MCP2104-X004B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 4m, Black Pulltab, Connector Label
MCP2104-X04AB	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 4.5m, Black Pulltab, Connector Label
MCP2104-X005B	Mellanox® passive copper cable, ETH 10GbE, 10Gb/s, SFP+, 5m, Black Pulltab, Connector Label

Warranty Information

Mellanox LinkX direct attach copper cables include a 1 year limited hardware warranty, which covers parts repair or replacement.

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53941PB
Rev 1.6

INTERCONNECT
PRODUCT BRIEF



40GbE QSFP+ Active Optical Cable

MC2210310-xxx

LinkX †

Mellanox® MC2210310 is a QSFP+ VCSEL-based (Vertical Cavity Surface-Emitting Laser) active optical cable (AOC) designed for use in 40GbE Ethernet systems. MC2210310 AOC offers high port density and configurability with a much longer reach than passive copper cables in the data center. Since the AOC is hot pluggable, it is easy to install and replace.

MC2210310 has a standard SFF-8665 compliant QSFP+ port on the electrical side towards the host system. It contains four multi-mode fibers (MMF) optic transceivers per end, each operating at data rates of up to 10.3125Gb/s. This integrated cable solution provides reliable transport for aggregate data rates of up to 40Gb/s.

Rigorous production testing ensures the best out-of-the-box installation experience, performance and durability. Mellanox's unique quality active fiber cable solutions provide power-efficient connectivity for data center interconnects. They enable higher port bandwidth, density and configurability at a low cost, and reduced power requirement in the data center.

Table 1 - Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply voltage	-0.3	3.6	V
Data input voltage	-0.5	3.9	V
Control input voltage	-0.3	3.9	V
Storage temperature	-10	70	°C

Table 2 - Operational Specifications

Parameter	Minimum	Typical	Maximum	Units
Supply voltage (Vcc)	3.15	3.3	3.45	V
Power consumption	---	0.8	1	Gb/s
Supply noise tolerance	66	---	---	mV

Table 3 - Cable Mechanical Specifications

Parameter	Value		Units
Diameter	Option 1: 3.3mm; Option 2: 3.0mm		mm
Minimum bend radius	35		mm
Length tolerance (See Figure 1 for the cable length definition.)	Length < 5m: 5m < Length < 50m: 50m < Length:	+300mm /-0 +500mm / -0 +1000mm /-0	m
Cable color	Length < 30m: Length > 30m:	(OM2) Orange (OM3) Aqua	m

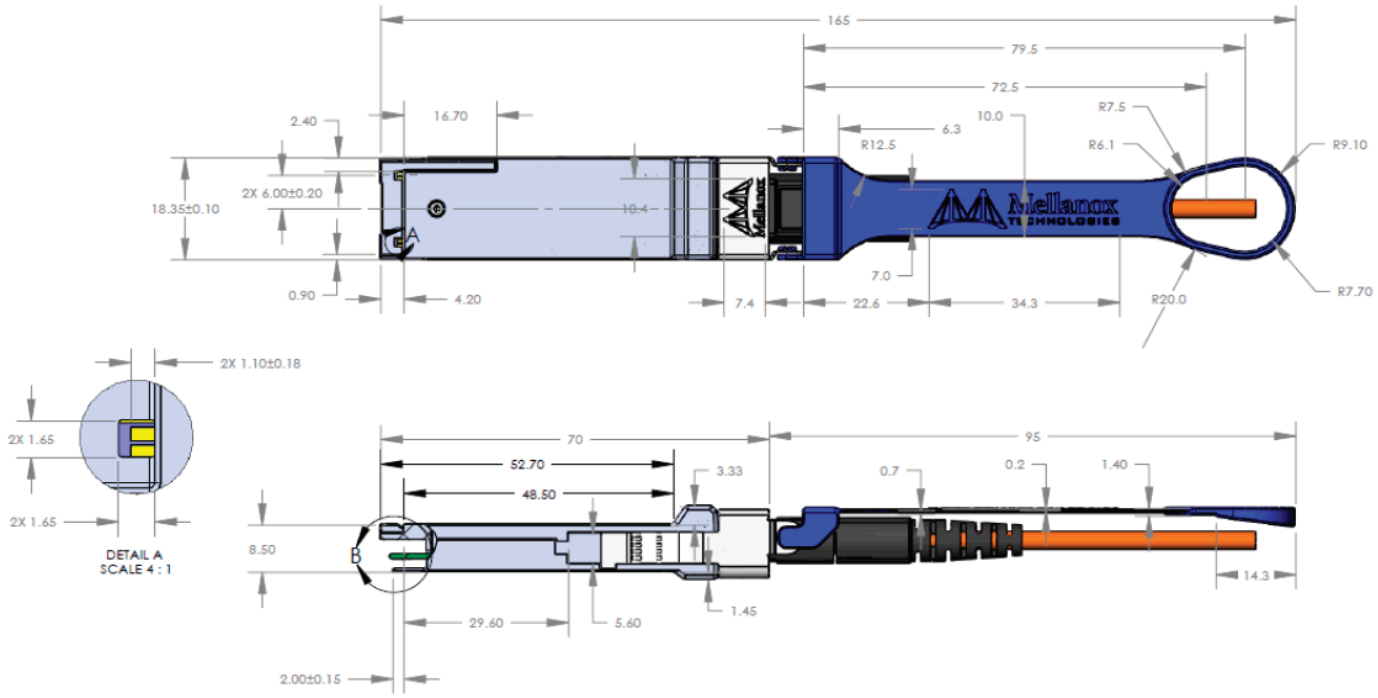
HIGHLIGHTS

- Up to 40GbE or 40Gb/s data rate
- Programmable Rx output amplitude
- 0.8W power consumption at low Rx output amplitude
- SFF-8685 and SFF-8436 compliant
- IEEE 802.3ba 40GbE compliant
- Operating case temperature 0-70°C
- 3.3V power supply
- BER better than 1E-15
- Hot pluggable
- Class 1 laser safety
- Up to 100 meters in length
- Standard multimode fiber
- RoHS compliant
- Plenum rated (OFNP)
- SFF-8636 compliant I²C management interface

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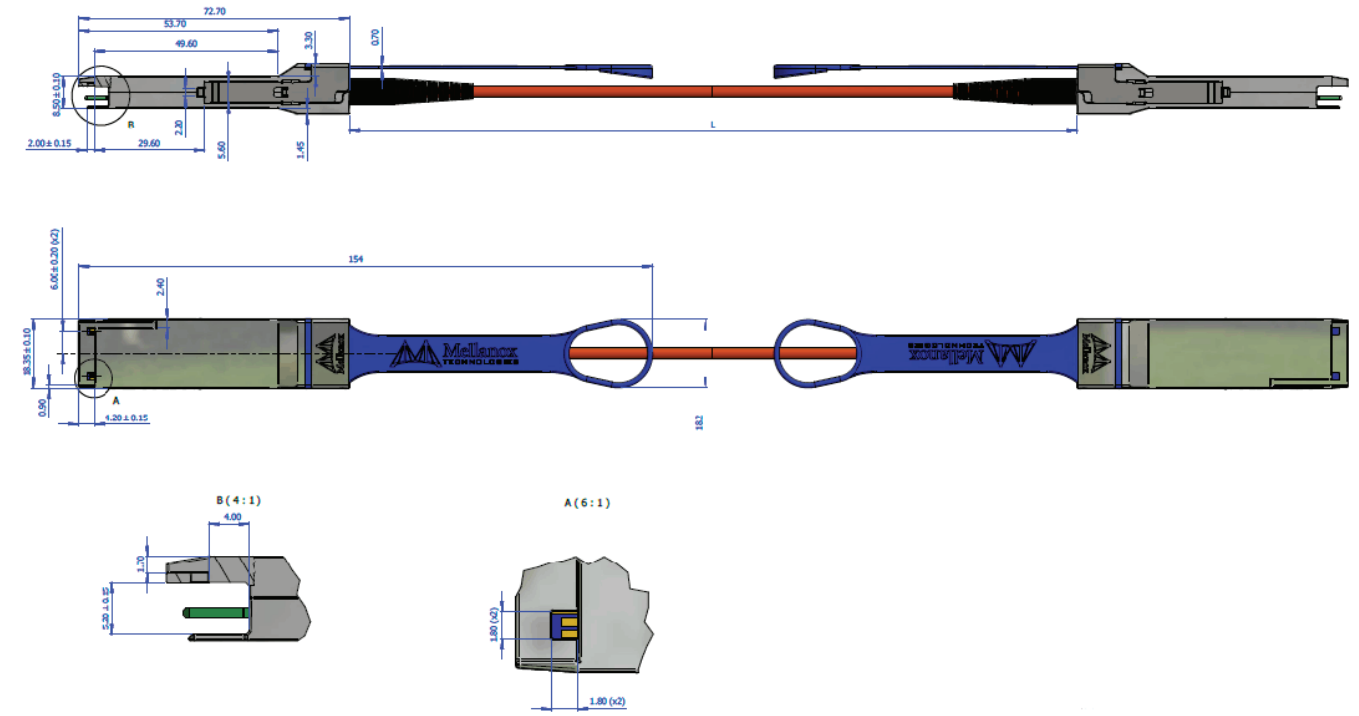
† For illustration only. Actual products may vary.

Mechanical Schematics (Option 1)



Note: Multiple options are specified to ensure supply chain robustness. The provided option depends on availability and may change from shipment to shipment.

Mechanical Schematics (Option 2)



Note: Multiple options are specified to ensure supply chain robustness. The provided option depends on availability and may change from shipment to shipment.

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Figure 1. *Cable Length Definition*

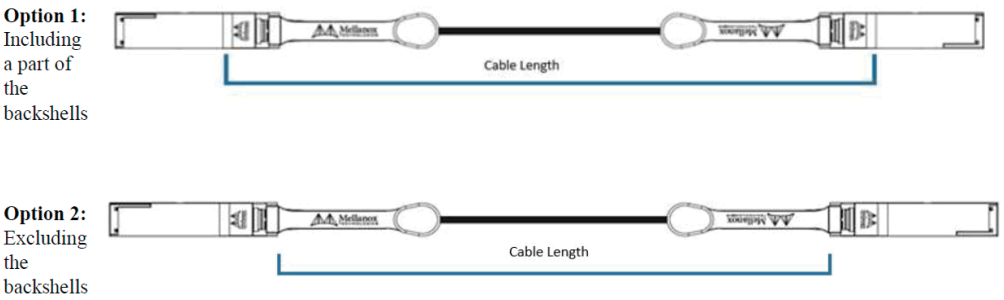


Table 4 - Part Number and Description

OPN	Description
MC2210310-003	Mellanox® active fiber cable, ETH 40GbE, 40Gb/s, QSFP, 3m
MC2210310-005	Mellanox® active fiber cable, ETH 40GbE, 40Gb/s, QSFP, 5m
MC2210310-010	Mellanox® active fiber cable, ETH 40GbE, 40Gb/s, QSFP, 10m
MC2210310-015	Mellanox® active fiber cable, ETH 40GbE, 40Gb/s, QSFP, 15m
MC2210310-020	Mellanox® active fiber cable, ETH 40GbE, 40Gb/s, QSFP, 20m
MC2210310-030	Mellanox® active fiber cable, ETH 40GbE, 40Gb/s, QSFP, 30m
MC2210310-050	Mellanox® active fiber cable, ETH 40GbE, 40Gb/s, QSFP, 50m
MC2210310-100	Mellanox® active fiber cable, ETH 40GbE, 40Gb/s, QSFP, 100m

Note. See Figure 1 for the cable length definition.

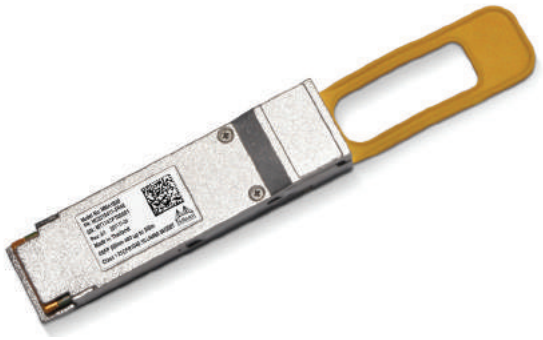
Warranty Information

Mellanox LinkX AOC cables include a 1 year limited hardware warranty, which covers parts repair or replacement.

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INTERCONNECT
PRODUCT BRIEF



40Gb/s QSFP+ MMF Optical Transceiver

MC2210411-SR4E

LinkX™ CABLES TRANSCEIVERS COMPONENTS †

Mellanox® MC2210411-SR4E is a 4-channel, pluggable, QSFP+, VCSEL-based (Vertical Cavity Surface Emitting Laser) optical transceiver designed for use in 40Gb/s networks operating at 4x10.3125Gb/s. This transceiver incorporates Mellanox integrated circuit technology, which combines high performance at low power. The transceiver operates over parallel multi-mode fiber (MMF), using a nominal wavelength of 850nm, and is SFF-8436 compliant.

MC2210411-SR4E transceiver has a standard QSFP+ connector on the electrical side towards the host system for power, control/monitoring and high-speed data. The optical interface is composed of four optical channels/fibers in each direction, intended for a parallel MMF cable via a standard MPO connector. The transceiver can operate at 10.3125Gb/s without retiming.

The transceiver provides digital diagnostic monitoring of supply voltage, temperature, transmit/receive power, and VCSEL bias.

Rigorous production testing ensures the best out-of-the-box installation experience, performance, and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Min	Max	Units
Supply voltage	-0.3	3.6	V
Data input voltage	-0.3	3.465	V
Control input voltage	-0.3	4	V
Damage Threshold (a)	3.4	--	dBm
Storage temperature	-40	85	°C

Table 2 - Operational Information

Parameter	Min	Typical	Max	Units
Supply voltage	3.135	3.3	3.465	V
Power dissipation	--	1.3	1.5	W
Supply noise tolerance (10Hz-10MHz)	66	--	--	mVpp
Operating case temperature	0	--	70	°C
Operating relative humidity	5	--	85	%RH

HIGHLIGHTS

- 40Gb/s Ethernet and FDR10
- Programmable Tx input equalizer
- Programmable Rx output amplitude
- Programmable Rx output emphasis
- SFF-8436 compliant QSFP+
- Single 3.3V supply
- QSFP+ power class 1
- BER better than 1E-15
- Class 1 laser safety
- Up to 400m on OM4 and 300m on OM3 multi-mode fiber
- Digital diagnostic monitoring (DDM)
- Hot pluggable
- RoHS compliant
- IEEE 802.3 40GBASE-SR4 compliant
- SFF-8636 compliant I^2C management interface

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Mechanical Schematics

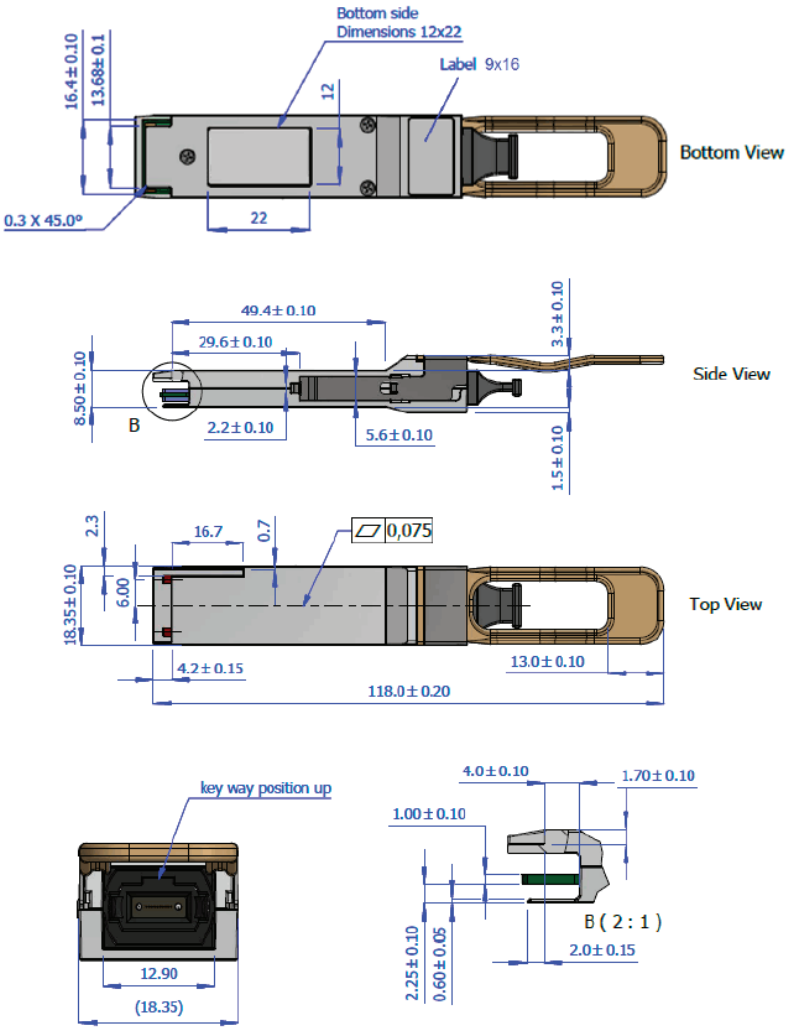


Table 3 - Part Number and Description

OPN	Description
MC2210411-SR4E	Mellanox® optical module, 40Gb/s, QSFP, MPO, 850nm, up to 300m

Warranty Information

Mellanox LinkX optical transceivers include a 1-year limited hardware warranty, which covers parts repair or replacement.

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INTERCONNECT
PRODUCT BRIEF



40GbE QSFP+ SR4-Lite Optical Transceiver

LinkX™ CABLES TRANSCEIVERS COMPONENTS †

MC2210411-SR4L

Each of Mellanox's 40GbE modules contains four fiber optic transceivers, each of the transceivers operates at data rates of up to 10.3125Gb/s.

The Mellanox 40GbE SR4-Lite transceiver is optimized for low-power consumption at reduced reaches of up to 30m where longer reaches are not necessary. The SR4-Lite transceiver in low-power mode offers 0.8W power consumption versus standard SR4s.

These SFF-8685 compliant modules provide reliable transport for aggregate data rates up to 40GbE Virtual Port Interconnect (VPI) and can be used for Ethernet link protocol.

Rigorous production testing ensures the best out-of-the-box installation experience, performance and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply voltage	-0.5	3.6	V
Data input voltage	-0.3	Vcc + 0.3	V
Control input voltage	-0.3	Vcc + 0.3	V
Damage threshold, per Lane	3.4	---	dBm
Operating case temperature	0	70	°C
Operating relative humidity	0	85	%
Storage temperature	-40	85	°C

Table 2 - Operational Information

Parameter	Minimum	Typical	Maximum	Units
Supply voltage (Vcc)	3.15	3.3	3.45	V
Power consumption at default Rx settings	---	1.0	1.2	W
Power consumption at low Rx settings	---	0.8	1.0	W
Supply noise rejection	---	---	50	mVpp

HIGHLIGHTS

- Up to 40GbE data rate
- Programmable Rx Output Amplitude
- 0.8W power consumption at low Rx output amplitude
- SFF-8685 compliant
- Operating case temperature of 0-70°C
- 3.3V power supply
- BER better than 1E-15
- Hot pluggable
- Class 1 Laser Safety
- Maximum link length of 30m on OM3 multimode fiber
- Single 1x12 MPO receptacle
- RoHS compliant

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Mechanical Schematics

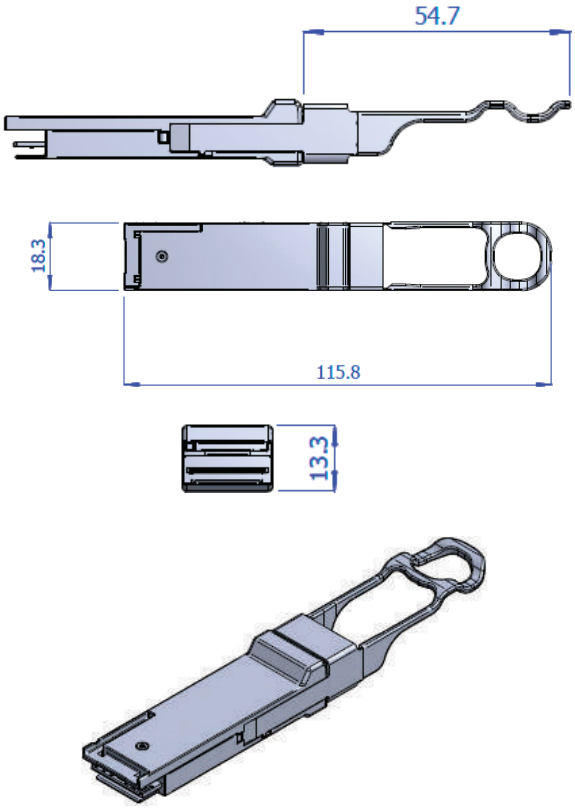


Table 3 - Part Number and Description

OPN	Description
MC2210411-SR4L	Mellanox® optical module, 40Gb/s, QSFP, MPO, 850nm, up to 30m

Warranty Information

The Mellanox LinkX optical transceivers include a 1 year limited hardware warranty, which covers parts repair or replacement.

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INTERCONNECT
PRODUCT BRIEF



40Gb/s QSFP+ SMF Optical Transceiver

LinkX †

MC2210511-LR4

The Mellanox® MC2210511-LR4 is a single mode module with four coarse wavelength division multiplexed (CWDM) channels, pluggable, QSFP+ optical transceiver, designed for use in 40Gb/s applications. This module incorporates CWDM DFB lasers and high sensitivity PIN receivers providing superior performance for 40GbE Ethernet applications up to 10km links and is compliant to optical interface with IEEE 802.3ba 40GBASE-LR4 and to SFF-8685. The transceiver operates over single mode fiber, using a nominal wavelength of 1310nm, and is SFF-8636 compliant.

Rigorous production testing ensures the best out-of-the-box installation experience, performance, and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply voltage	-0.5	3.6	V
Data input voltage	-0.3	Vcc+0.3	Vpp
Control input voltage	-0.3	Vcc+0.3	V
Damage threshold, per lane	3.4	--	dBm
Storage temperature	-40	85	°C

Table 2 - Operational Specifications

Parameter	Minimum	Typical	Maximum	Units
Supply voltage (Vcc)	3.1	3.3	3.47	V
Power consumption	---	---	Option 1: 2.8 Option 2: 3.5	W
Supply noise rejection	---	---	50	mVpp
Operating case temperature	0	---	70	°C
Operating relative humidity	Option 1: 5 Option 2: 0	---	Option 1: 95 Option 2: 85	%

Note. Multiple options are specified to ensure supply chain robustness. The provided option depends on availability and may change from shipment to shipment.

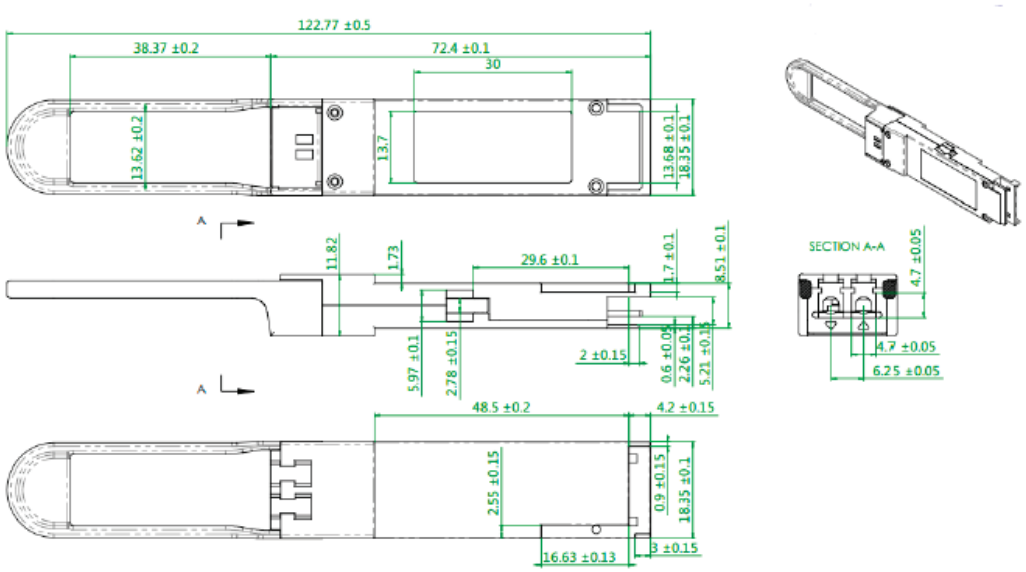
HIGHLIGHTS

- Up to 40Gb/s
- Single 3.3V supply voltage
- Less than 2.8W power consumption
- SFF-8685 compliant
- Operating case temperature of 0-70°C
- 3.3V power supply
- BER better than 1E-15
- Hot pluggable
- Class 1 laser safety
- Maximum link length of 10km on single-mode fiber (SMF)
- CWDM DFB laser and PIN receiver
- Duplex LC receptacles
- Digital diagnostic monitoring (DDM)
- RoHS compliant
- IEEE 802.3ba 40GBASE-LR4 compliant
- SFF-8636 compliant I²C management interface

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Mechanical Schematics (Option 1)



Note: Multiple options are specified to ensure supply chain robustness. The provided option depends on availability and may change from shipment to shipment.

Mechanical Schematics (Option 2)

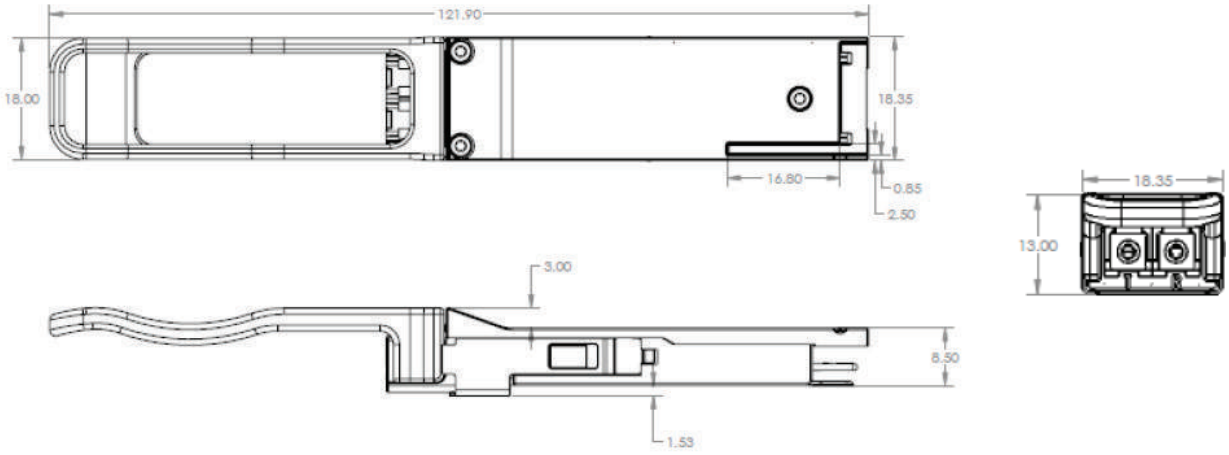


Table 3 - Part Number and Description

OPN	Description
MC2210511-LR4	Mellanox® optical module, 40Gb/s, QSFP, LC-LC, 1310nm, LR4 up to 10km

Warranty Information

Mellanox LinkX optical transceivers include a 1-year limited hardware warranty, which covers parts repair or replacement.

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INTERCONNECT
PRODUCT BRIEF



10GbE QSFP+ to SFP+ DAC Adapter Cable

MC2309124-xxx | MC2309130-xxx

LinkX™ CABLES TRANSCEIVERS COMPONENTS †

Mellanox's QSFP to SFP+ passive DAC adapter cables are compliant with SFF-8431 and SFF-8436 specifications and provide connectivity between devices using QSFP port on one end to an SFP+ port on the other end. The cables use state-of-the-art signal processing technology to fill the expanding need for cost-effective data center interconnects.

Mellanox's unique, quality, passive, copper, cable solutions provide a power-efficient replacement for active power connectivity, such as fiber optic cables. Optimizing systems to operate with Mellanox's QSFP to SFP+ passive copper adapter cables significantly reduces power consumption and enlarges the connectivity opportunities of the system.

Rigorous cable production testing ensures the best out-of-the-box installation experience, performance and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Specification
Voltage	30VAC (rms) or DC
Current	0.5A/contact
Operating temperature	0°C to 70°C

Table 2 - Cable Specifications and Ordering Information

Maximum Reach @10Gb/s (meters)	AWG	Ordering Part Number
1	30	MC2309130-001
2	30	MC2309130-002
3	30	MC2309130-003
4	24	MC2309124-004
5	24	MC2309124-005
7	24	MC2309124-007

HIGHLIGHTS

- Compliant to industry standards:
  - InfiniBand Architecture specification
    - QSFP MSA SFF-8436
    - SFP+ MSA SFF-8431
- BER better than 1E-15
- Low crosstalk
- Low insertion loss
- Matched impedance
- Secure latching mechanism
- RoHS-5 compliant

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Mechanical Schematics

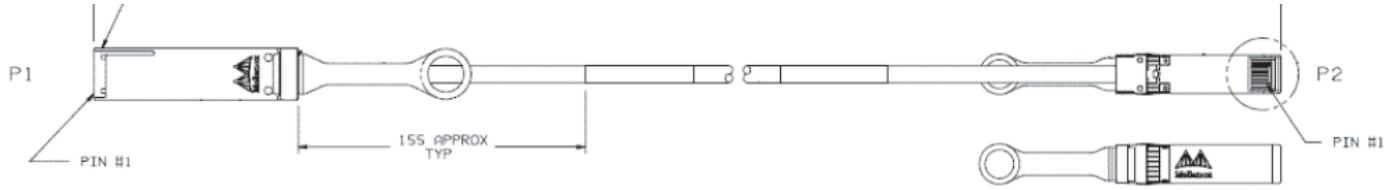


Table 3 - Part Number and Description

OPN	Description
MC2309130-001	Mellanox® passive copper hybrid cable, ETH 10GbE, 10Gb/s, QSFP to SFP+, 1m
MC2309130-002	Mellanox® passive copper hybrid cable, ETH 10GbE, 10Gb/s, QSFP to SFP+, 2m
MC2309130-003	Mellanox® passive copper hybrid cable, ETH 10GbE, 10Gb/s, QSFP to SFP+, 3m
MC2309124-004	Mellanox® passive copper hybrid cable, ETH 10GbE, 10Gb/s, QSFP to SFP+, 4m
MC2309124-005	Mellanox® passive copper hybrid cable, ETH 10GbE, 10Gb/s, QSFP to SFP+, 5m
MC2309124-007	Mellanox® passive copper hybrid cable, ETH 10GbE, 10Gb/s, QSFP to SFP+, 7m

Warranty Information

Mellanox LinkX direct attach copper cables include a 1 year limited hardware warranty, which covers parts repair or replacement.

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40GbE to 4x10GbE (QSFP+ to 4xSFP+) Direct Attach Copper Splitter Cable

MC2609125-xxx | MC2609130-xxx | MCP790x-XxxxA

Mellanox's QSFP+ to 4x SFP+ passive, copper, splitter cables are 40GbE to 10GbE cable assemblies. The cables are compliant with SFF-8418/8419 and SFF-8685/8436 specifications and provide connectivity between devices using QSFP+ port on one end and four SFP+ ports on the other end.

Mellanox's unique, quality, passive, copper, cable solutions provide power-efficient replacement for active power connectivity such as fiber optic cables. Rigorous cable production testing ensures best out-of-the-box installation experience, performance and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Operating voltage	-0.3	3.65	V
Input voltage	-0.3	3.65	V

Table 2 - Operational Specifications

Parameter	Minimum	Typical	Maximum	Units
Supply voltage (Vcc)	3.15	3.3	3.45	V
Data rate per lane	1	---	10.5	Gb/s
Operating temperature	0	---	70	°C
Storage ambient temperature	-10	---	75	°C

Table 3 - Cable Specifications and Ordering Information

Maximum Reach @ 10Gb/s (meters)	Cable Diameter QSFP+/SFP+	Part Number
1	6.1mm / 4.5mm	MC2609130-001
3	6.1mm / 4.5mm	MC2609130-003
5	9.3mm / 6mm	MC2609125-005

LinkX™ CABLES TRANSCEIVERS COMPONENTS †

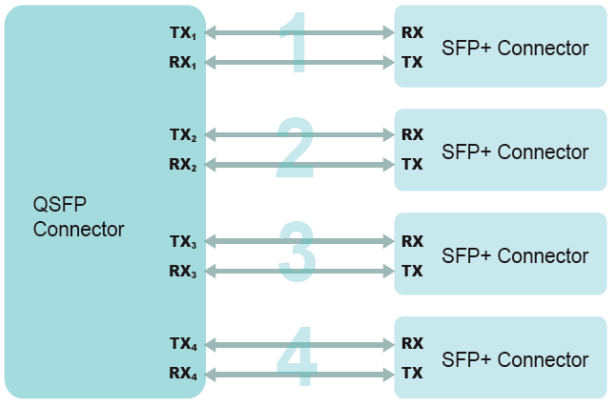
HIGHLIGHTS

- 40GbE to 4x10GbE data rate
- SFF-8685/8436 compliant
- Operating case temperature of 0-70°C
- 3.3V power supply
- BER better than 1E-15
- Hot pluggable
- RoHS compliant
- SFF-8431/8432 compliant

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Cable Splitter Schematics: QSFP+ to 4xSFP+



Note: No polarity inversion is allowed.

Figure 1. *Cable Length Definition*

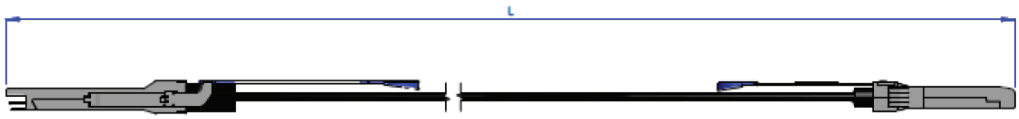


Table 4 - Part Number and Description

OPN	Description
MC2609130-001	Mellanox® passive copper hybrid cable, ETH 40GbE to 4x10GbE, QSFP to 4xSFP+, 1m
MC2609130-003	Mellanox® passive copper hybrid cable, ETH 40GbE to 4x10GbE, QSFP to 4xSFP+, 3m
MC2609125-005	Mellanox® passive copper hybrid cable, ETH 40GbE to 4x10GbE, QSFP to 4xSFP+, 5m
MCP7900-X01AA	Mellanox® passive copper hybrid cable, ETH 40GbE to 4x10GbE, QSFP to 4xSFP+, 1.5m, Blue Pulltab, customized label
MCP7904-X002A	Mellanox® passive copper hybrid cable, ETH 40GbE to 4x10GbE, QSFP to 4xSFP+, 2m, Black Pulltab, customized label
MCP7904-X01AA	Mellanox® passive copper hybrid cable, ETH 40GbE to 4x10GbE, QSFP to 4xSFP+, 1.5m, Black Pulltab, customized label

Note 1. See Figure 1 for the cable length definition.

Warranty Information

Mellanox LinkX DAC cables include a 1-year limited hardware warranty, which covers parts repair or replacement.

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1GbE SFP SX Optical Transceiver

LinkX †

MC3208011-SX

Mellanox® active optical cable modules provide outstanding performance for high-bandwidth fabrics, extending the benefits of Mellanox's high-performance for Ethernet adapters and switches throughout the network.

Mellanox certified modules are 100% tested on Mellanox equipment to ensure optimal signal integrity and the best end-to-end performance.

Mellanox SFP optical modules use an LC-LC connector type to connect a single mode or multimode fiber cable.

Mellanox optical solutions provide short, medium and long range scalability for all topologies, utilizing innovative optical technologies to enable extremely high signal integrity and reliability. Rigorous production testing ensures the best out-of-the-box installation experience, performance, and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply voltage	-0.5	4.0	V
Storage ambient temperature	-40	85	°C
Operating case temperature	-20	85	°C
Humidity	0	85	%

Table 2 - Operational Specifications

Parameter	Minimum	Typical	Maximum	Units
Data rate - BR	---	1.062 1.25 2.125	---	Gb/s
Data rate - BER	---	---	10^{-12}	
Cable length Fiber on 50/125um MMF	---	---	550 @ 1.062 Gb/s 300 @ 2.125 Gb/s	m
Cable length Fiber on 62.5/125um MMF	---	---	300 @ 1.062 Gb/s 150 @ 2.125 Gb/s	m

HIGHLIGHTS

- Up to 2.125 Gb/s bi-directional data links
- Hot-pluggable SFP
- 850nm oxide VCSEL laser transmitter
- Duplex LC connector
- RoHS compliant and lead free
- Up to 550m on 50/125 µm MMF
- Up to 300m on 62.5/125 µm MMF
- Single 3.3V power supply
- Low power dissipation
- Tested in Mellanox's end-to-end environment

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Mechanical Schematics

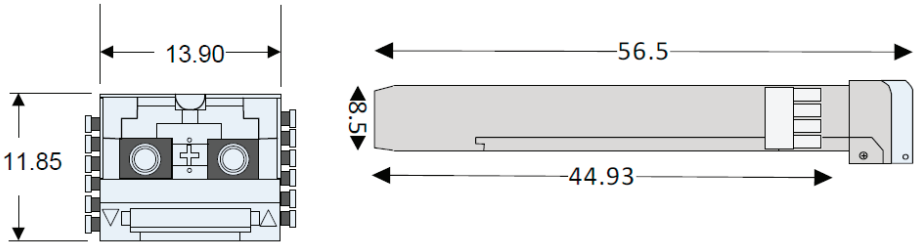


Table 3 - Part Number and Description

OPN	Description
MC3208011-SX	Mellanox® Optical module, ETH 1GbE, 1Gb/s, SFP, LC-LC, SX 850nm, up to 500m

Warranty Information

Mellanox LinkX optical transceivers include a 1-year limited hardware warranty, which covers parts repair or replacement.

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60346PB
Rev 1.0

INTERCONNECT
PRODUCT BRIEF



1GbE SFP 1000BASE-T Transceiver

LinkX †

MC3208411-T

Mellanox® 1000BASE-T copper SFP modules provide reliable transport for aggregate data rates of up to 1.25GbE. These modules are compatible with the Gigabit Ethernet and 1000BASE-T standards.

The 1000BASE-T physical layer IC (PHY), including all settings and features, can be accessed via I^2C.

Rigorous production testing ensures the best out-of-the-box installation experience, performance, and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Minimum	Typical	Maximum	Units
Supply voltage	---	320	375	mA
Input voltage (referenced to GND)	3.13	3.3	3.47	Vcc
Maximum voltage	---	---	4	Vmax
Surge current	---	---	30[A]	mA
Storage ambient temperature	-40	---	85	°C

Table 2 - Operational Specifications

Parameter	Minimum	Typical	Maximum	Units
Power consumption	---	1.05	1.2[B]	W
Single ended data input swing	250	---	1200	mV
Single ended data output swing	350	---	800	mV
Rise/fall time (20%-80%)	---	175	---	ps
Tx input impedance (single ended)	---	50	---	ohm
Rx output impedance (single ended)	---	50	---	ohm
Operating case temperature	0	---	85	°C

Notes: (A) Hot plug above steady state current. (B) 1.2W max power over full range of voltage and temperature.
Caution: Power consumption and surge current are higher than the specified values in the SFP multi-source agreement (MSA).

HIGHLIGHTS

- Up to 1.25Gb/s bi-directional data links
- Hot-pluggable SFP footprint
- Extended case temperature range (0°C to +85°C)
- Fully metallic enclosure for low EMI
- Low power dissipation (1.05 W typ.)
- Compact RJ-45 connector assembly
- RoHS compliant and lead free
- Access to physical layer IC via 2-wire serial bus
- 10/100/1000 BASE-T operation in host systems with SGMII interfaces
- 1.25 Gigabit Ethernet over Cat 5 cable

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† For illustration only. Actual products may vary.

Mechanical Schematics

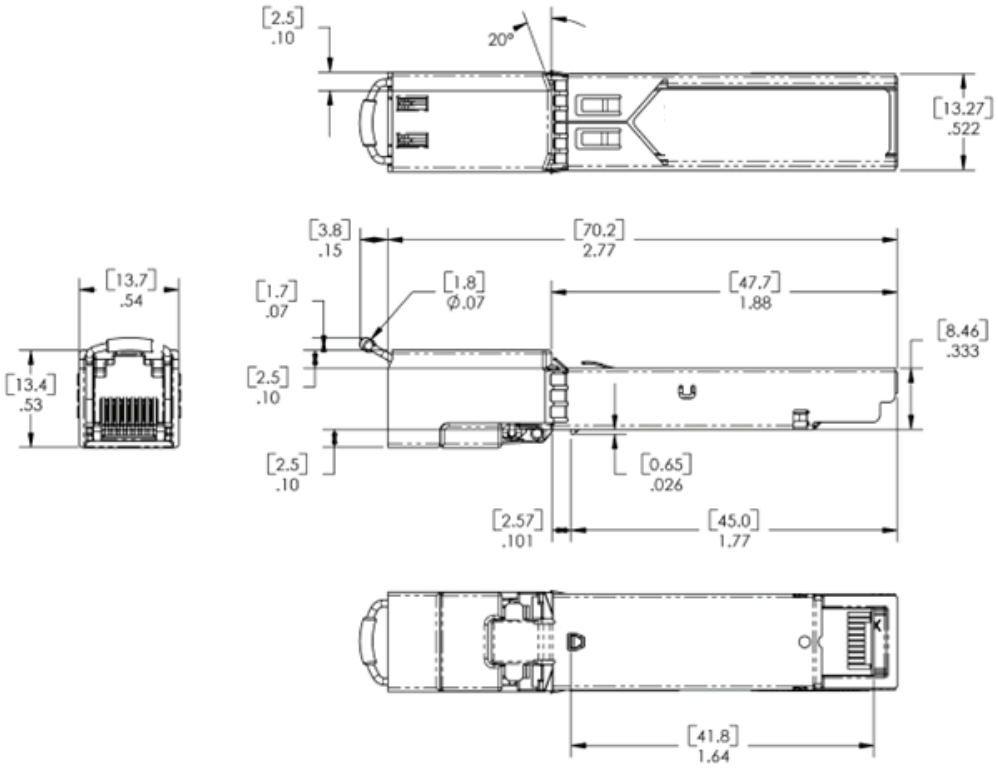


Table 3 - Part Number and Description

OPN	Description
MC3208411-T	Mellanox® module, ETH 1GbE, 1Gb/s, SFP, Base-T, up to 100m

Warranty Information

Mellanox LinkX transceivers include a 1-year limited hardware warranty, which covers parts repair or replacement.

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INTERCONNECT
PRODUCT BRIEF



25GbE SFP28 Direct Attach Copper Cables

MCP2M00-A0xxxxxx

Mellanox® MCP2M00-A0xxxxxx direct attach copper cables are high speed, cost-effective alternatives to fiber optics in 25GbE Ethernet applications.

MCP2M00 passive copper cables[1] contain a single high-speed copper pair, operating at data rates of up to 25GbE. The cables are compliant SFF-8402 SFP28 standard. Each SFP28 port comprises an EEPROM providing product information, which can be read by the host system.

MCP2M00 cables up to 2m support IEEE 802.3by CA-25G-N (Cable Assembly No-FEC) with low latency. Cables from 4m to 5m support IEEE 802.3by CA-25G-L (Cable Assembly Long) with RS-FEC (Reed Solomon Forward Error Correction) enabled. For 2.5m and 3m cables there are two versions supporting either CA-25G-N or CA-25G-L.

Mellanox's unique quality passive copper cable solutions provide power-efficient connectivity for short distance interconnects. They enable higher port bandwidth, density and configurability at a low cost and reduced power requirement in the data centers.

Rigorous cable production testing ensures best out-of-the-box installation experience, performance and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply voltage	-0.3	3.6	V
Data input voltage	-0.3	3.6	V
Control input voltage	-0.3	3.6	V
Storage temperature	-40	85	°C

Table 2 - Operational Specifications

Parameter	Minimum	Typical	Maximum	Units
Supply voltage (Vcc)	3.135	3.3	3.465	V
Power consumption	---	---	0.1	W
Operating case temperature	0	---	70	°C
Operating relative humidity	5	---	85	%

Table 3 - Electrical Specifications

Parameter	Min	Typical	Max	Units
Characteristic impedance	90	100	110	Ω
Time propagation delay (informative)	--	--	4.5	ns/m

HIGHLIGHTS

- Up to 25GbE data rate
- SFF-8402 compliant SFP28
- Operating case temperature 0-70°C
- Single 3.3V supply voltage
- Bit Error Rate (BER) better than 1E-15 with Mellanox systems
- Hot pluggable
- RoHS6 compliant
- LSZH (Low Smoke Zero Halogen) jacket
- LF (Lead Free) HF (Halogen Free) PCB
- SFF-8636 compliant I²C management interface

[1] Raw cables are provided from different sources to ensure supply chain robustness.

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Table 4 - Cable Mechanical Specifications

OPN	AWG	Length (m)	Single Cable Diameter	Minimum Bend Radius	Length Tolerance
MCP2M00-A00AE30N	30	0.5	4.5 ± 0.2mm	Single bend: 21mm Repetitive and assembly bend: 45mm	±25mm
MCP2M00-A001E30N		1			
MCP2M00-A01AE30N		1.5			
MCP2M00-A002E30N		2			
MCP2M00-A02AE30L		2.5			
MCP2M00-A003E30L		3			
MCP2M00-A02AE26N	26	2.5	5.8 +0.3/-1.0mm	Single bend: 29mm Repetitive and assembly bend: 58mm	±50mm
MCP2M00-A003E26N		3			
MCP2M00-A004E26L		4			
MCP2M00-A005E26L		5			

Note 1. The minimum assembly bending radius (close to the connector) is 10x the cable's outer diameter. The repeated bend (far from the connector) is also 10x the cable's outer diameter. The single bend (far from the connector) is 5x the cable's outer diameter.

Figure 1. *Assembly Bending Radius*

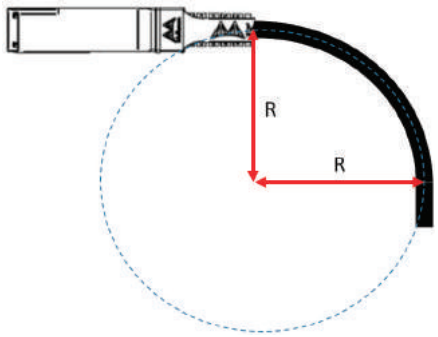
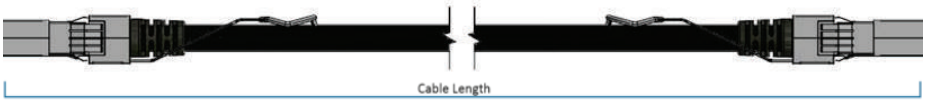


Table 5 - Part Numbers and Descriptions

OPN	Description
MCP2M00-A00AE30N	Mellanox® Passive Copper cable, ETH, up to 25Gb/s, SFP28, 0.5m, Black, 30AWG, CA-N
MCP2M00-A001E30N	Mellanox® Passive Copper cable, ETH, up to 25Gb/s, SFP28, 1m, Black, 30AWG, CA-N
MCP2M00-A01AE30N	Mellanox® Passive Copper cable, ETH, up to 25Gb/s, SFP28, 1.5m, Black, 30AWG, CA-N
MCP2M00-A002E30N	Mellanox® Passive Copper cable, ETH, up to 25Gb/s, SFP28, 2m, Black, 30AWG, CA-N
MCP2M00-A02AE30L	Mellanox® Passive Copper cable, ETH, up to 25Gb/s, SFP28, 2.5m, Black, 30AWG, CA-L
MCP2M00-A02AE26N	Mellanox® Passive Copper cable, ETH, up to 25Gb/s, SFP28, 2.5m, Black, 26AWG, CA-N
MCP2M00-A003E30L	Mellanox® Passive Copper cable, ETH, up to 25Gb/s, SFP28, 3m, Black, 30AWG, CA-L
MCP2M00-A003E26N	Mellanox® Passive Copper cable, ETH, up to 25Gb/s, SFP28, 3m, Black, 26AWG, CA-N
MCP2M00-A004E26L	Mellanox® Passive Copper cable, ETH, up to 25Gb/s, SFP28, 4m, Black, 26AWG, CA-L
MCP2M00-A005E26L	Mellanox® Passive Copper cable, ETH, up to 25Gb/s, SFP28, 5m, Black, 26AWG, CA-L

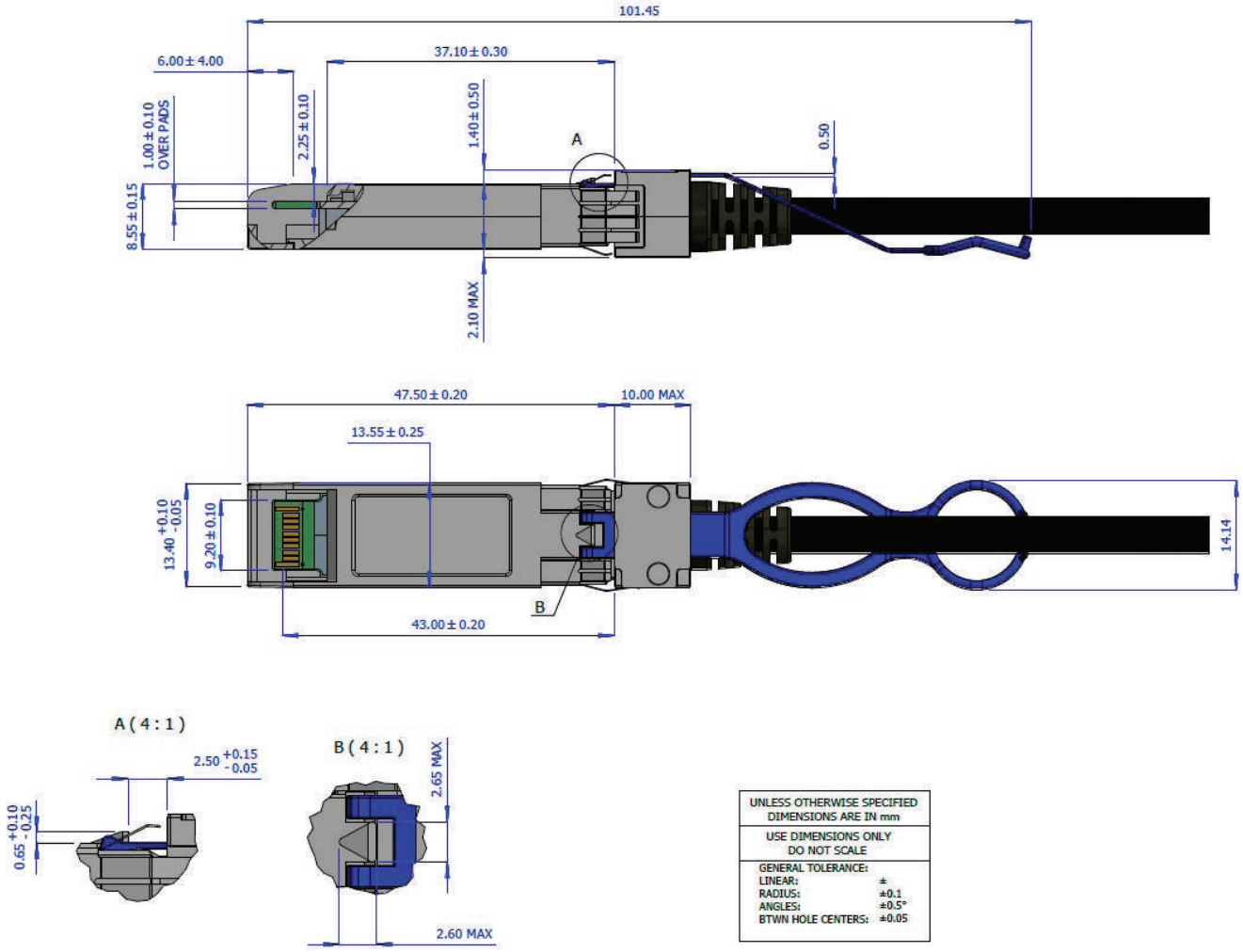
Note 1. See Figure 2 for the cable length definition.

Figure 2. *Cable Length Definition*



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Mechanical Schematics



Warranty Information

Mellanox LinkX direct attach copper cables include a 1 year limited hardware warranty, which covers parts repair or replacement.

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INTERCONNECT
PRODUCT BRIEF



100GbE to 4x25GbE (QSFP28 to 4xSFP28) Direct Attach Copper Splitter Cable

MCP7F00-A0xxRyyz

Mellanox® MCP7F00-A0xxRyyz DAC splitter cables are a high speed, cost-effective 100GbE to 4 x 25GbE Ethernet connectivity solution, designed to meet the growing needs for higher bandwidth in data centers.

MCP7F00-A0xxRyyz cables are compliant with SFF-8402 SFP28 and SFF-8665 QSFP28 standard specifications and provide connectivity between system units with a QSFP28 port on one side and up to four different SFP28 ports on the other. The cable connects data signals from each of the 4 copper pairs on the QSFP28 end to the single pair of each of the SFP28 ends. Each QSFP28/SFP28 port comprises an EEPROM providing product information, which can be read by the host system.

MCP7F00-A0xxRyyz cables up to 2m support IEEE 802.3by CA-25G-N (Cable Assembly No-FEC) with low latency. Cables from 3m to 5m support IEEE 802.by CA-25G-L (Cable Assembly Long) with RS-FEC (Reed Solomon Forward Error Correction) enabled. For 2.5m and 3m cables there are two versions supporting either CA-25G-N or CA-25G-L.

Mellanox's unique quality passive copper cable solutions provide power-efficient connectivity for short distance interconnects. They enable higher port bandwidth, density and configurability at a low cost and reduced power requirement in the data centers.

Rigorous cable production testing ensures best out-of-the-box installation experience, performance and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply voltage	-0.3	3.6	V
Data input voltage	-0.3	3.6	V
Control input voltage	-0.3	3.6	V
Storage temperature	-40	85	°C

Table 2 - Operational Specifications

Parameter	Minimum	Typical	Maximum	Units
Supply voltage (Vcc)	3.135	3.3	3.465	V
Power consumption	---	---	0.1	W
Operating case temperature	0	---	70	°C
Operating relative humidity	5	---	85	%

HIGHLIGHTS

- 100GbE to 4x25GbE data rate
- 40GbE to 4x10GbE data rate
- SFF-8402 SFP28 compliant
- SFF-8665 QSFP28 compliant
- Operating case temperature 0-70°C
- Single 3.3V supply voltage
- Bit Error Rate (BER) better than 1E-15 with Mellanox systems
- Hot pluggable
- RoHS compliant
- LSZH (Low Smoke Zero Halogen) jacket
- LF (Lead Free) HF (Halogen Free) PCB
- SFF-8636 compliant I²C management interface

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† For illustration only. Actual products may vary.

Table 3 - Electrical Specifications

Parameter	Minimum	Typical	Maximum	Units
Characteristic impedance	90	100	110	Ω
Time propagation delay (informative)	---	---	4.5	ns/m

Note 1. Minimum insertion loss for up to 1m cable length is 6dB @ 12.89GHz.

Table 4 - Cable Mechanical Specifications

OPN (see Table 5)	AWG	Cable Length	Single Cable Diameter	Minimum Bend Radius	Length Tolerance
MCP7F00-A001R30N	30	1	4.5 ± 0.2 mm (LSZH)	Single bend: 21mm Repeated bend: 45mm	± 25mm
MCP7F00-A01AR30N		1.5			
MCP7F00-A002R30N		2			
MCP7F00-A02AR30L		2.5			
MCP7F00-A003R30L		3			
MCP7F00-A02AR26N	26	2.5	5.8 ± +0.3mm/-1.0mm	Single bend: 29mm Repeated bend: 58mm	± 50mm
MCP7F00-A003R26N		3			
MCP7F00-A03AR26L		3.5			
MCP7F00-A005R26L		5			

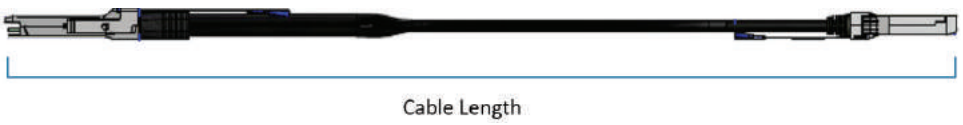
Note 1. See Figure 1 for the cable length definition.

Table 5 - Part Numbers and Descriptions

OPN	Description
MCP7F00-A001R30N	Mellanox® passive copper hybrid cable, ETH 100GbE to 4x25GbE, QSFP28 to 4xSFP28, 1m, Colored, 30AWG, CA-N
MCP7F00-A01AR30N	Mellanox® passive copper hybrid cable, ETH 100GbE to 4x25GbE, QSFP28 to 4xSFP28, 1.5m, Colored, 30AWG, CA-N
MCP7F00-A002R30N	Mellanox® passive copper hybrid cable, ETH 100GbE to 4x25GbE, QSFP28 to 4xSFP28, 2m, Colored, 30AWG, CA-N
MCP7F00-A02AR30L	Mellanox® passive copper hybrid cable, ETH 100GbE to 4x25GbE, QSFP28 to 4xSFP28, 2.5m, Colored, 30AWG, CA-L
MCP7F00-A02AR26N	Mellanox® passive copper hybrid cable, ETH 100GbE to 4x25GbE, QSFP28 to 4xSFP28, 2.5m, Colored, 26AWG, CA-N
MCP7F00-A003R30L	Mellanox® passive copper hybrid cable, ETH 100GbE to 4x25GbE, QSFP28 to 4xSFP28, 3m, Colored, 30AWG, CA-L
MCP7F00-A003R26N	Mellanox® passive copper hybrid cable, ETH 100GbE to 4x25GbE, QSFP28 to 4xSFP28, 3m, Colored, 26AWG, CA-N
MCP7F00-A03AR26L	Mellanox® passive copper hybrid cable, ETH 100GbE to 4x25GbE, QSFP28 to 4xSFP28, 3.5m, Colored, 26AWG, CA-L
MCP7F00-A005R26L	Mellanox® passive copper hybrid cable, ETH 100GbE to 4x25GbE, QSFP28 to 4xSFP28, 5m, Colored, 26AWG, CA-L

Note 1. See Figure 1 for the cable length definition.
Note 2. Raw cables are provided from different sources to ensure supply chain robustness.
Note 3. xx = reach; R = rainbow pulltab color; yy = wire gauge; z = link code

Figure 1. *Cable Length Definition*



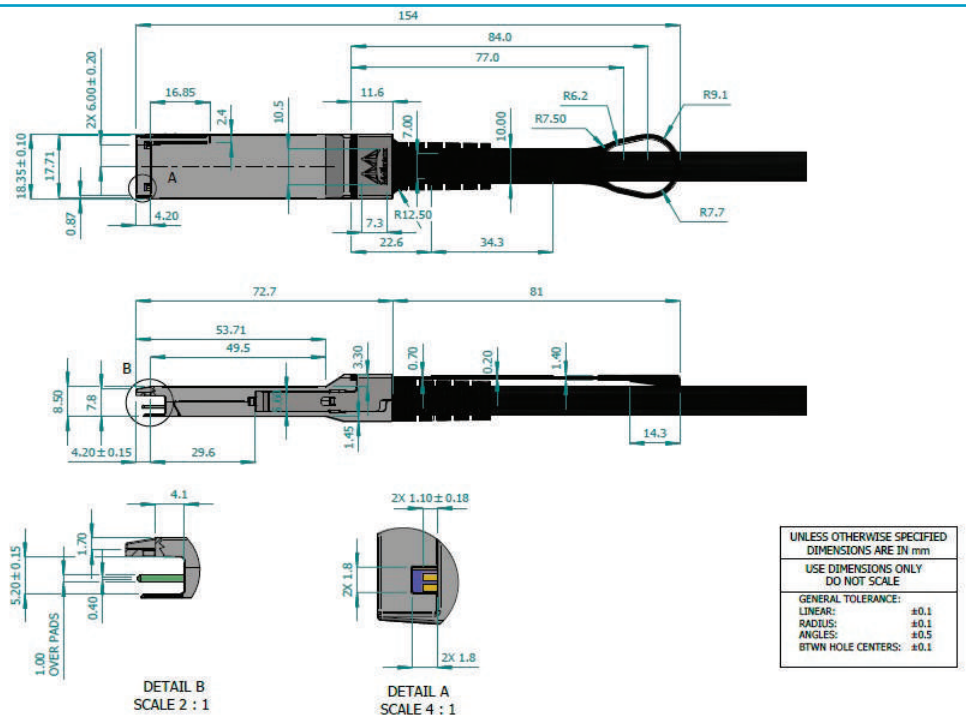
Mechanical Schematics



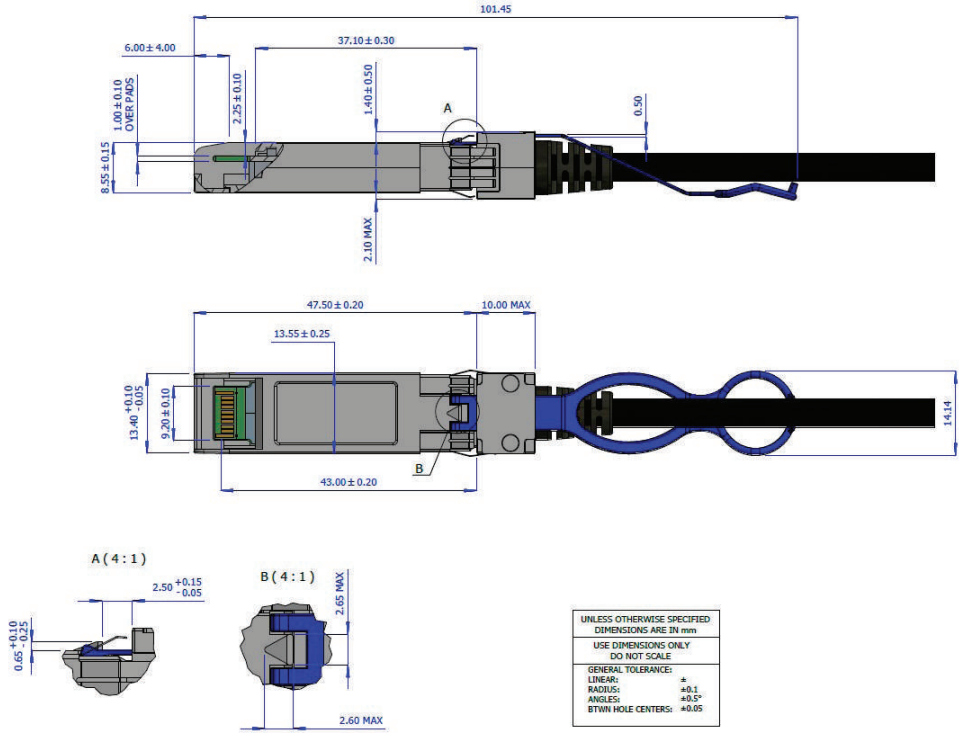
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Mechanical Schematics (cont.)

QSFP28 End



SFP28 End



Warranty Information

Mellanox LinkX direct attach copper cables include a 1-year limited hardware warranty, which covers parts repair or replacement.

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INTERCONNECT
PRODUCT BRIEF



400GbE to 8x50GbE (QSFP-DD to 8xSFP56) Direct Attach Copper Splitter Cable

MCP7F80-W0xxRyy

LinkX †

Mellanox® MCP7F80-W0xxRyy DAC splitter cables are a high speed, cost-effective 400GbE to 8 x 50GbE Ethernet connectivity solution, designed to meet the growing needs for higher bandwidth in data centers.

MCP7F80-W0xxRyy cables provide connectivity between system units with a QSFP-DD port on one side and up to eight different SFP56 ports on the other side. The cable connects data signals from each of the 8 copper pairs on the QSFP-DD end to the single pair of each of the SFP56 ends. Each QSFP-DD/SFP56 port comprises an EEPROM providing product information, which can be read by the host system.

Mellanox's unique quality passive copper cable solutions provide power-efficient connectivity for short distance interconnects. They enable higher port bandwidth, density and configurability at a low cost and reduced power requirement in the data centers.

Rigorous cable production testing ensures best out-of-the-box installation experience, performance and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply voltage	-0.3	3.6	V
Data input voltage	-0.3	3.6	V
Control input voltage	-0.3	3.6	V
Storage temperature	-40	85	°C

Table 2 - Operational Specifications

Parameter	Minimum	Typical	Maximum	Units
Supply voltage (Vcc)	3.135	3.3	3.465	V
Power consumption	---	---	0.1	W
Operating case temperature	0	---	70	°C
Operating relative humidity	5	---	85	%

Table 3 - Electrical Specifications

Parameter	Minimum	Typical	Maximum	Units
Characteristic impedance	90	100	110	Ω
Time propagation delay (informative)	---	---	4.5	ns/m

HIGHLIGHTS

- 400GbE to 8x50GbE data rate
- Compliant I²C management interfaces:
  - QSFP-DD CMIS on QSFP-DD end
  - SFF-8472 on SFP end
- Operating case temperature of 0-70°C
- Single 3.3V supply voltage
- BER better than 1E-15 with Mellanox end-to-end systems
- Hot pluggable
- RoHS compliant
- Low Smoke Zero Halogen (LSZH) jacket
- LF (Lead Free) HF (Halogen Free) PCB

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† For illustration only. Actual products may vary.

Table 4 - Cable Mechanical Specifications

Ordering Part No.	Length Tolerance	AWG	Single Cable Diameter	Minimum Bend Radius	Minimum Assembly Space	Cable Color
MCP7F80-W001R30	1m ± 0.025mm	30	4.8 ± 0.2mm	Single bend: 24mm Assembly/repeated bend: 48mm	195mm	Black
MCP7F80-W01AR30	1.5m ± 0.025mm					
MCP7F80-W002R26	2m ± 0.050mm	26	5.1 ± 0.3mm	Single bend: 25.5mm Assembly/repeated bend: 51mm	Assembly space calculation is based on repeated bend radius.	
MCP7F80-W02AR26	2.5m ± 0.050mm					
MCP7F80-W003R26	3m ± 0.050mm					

Figure 1. *Assembly Bending Radius*

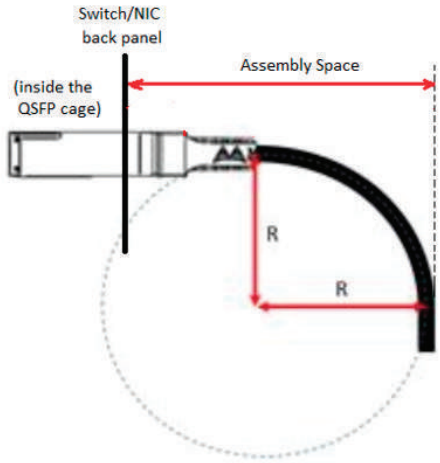
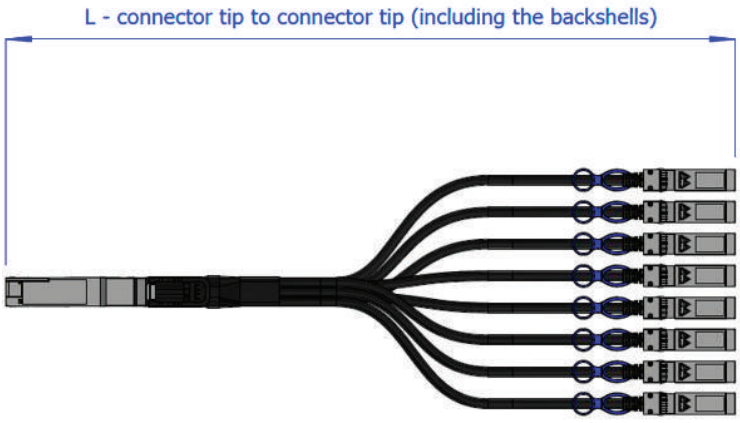


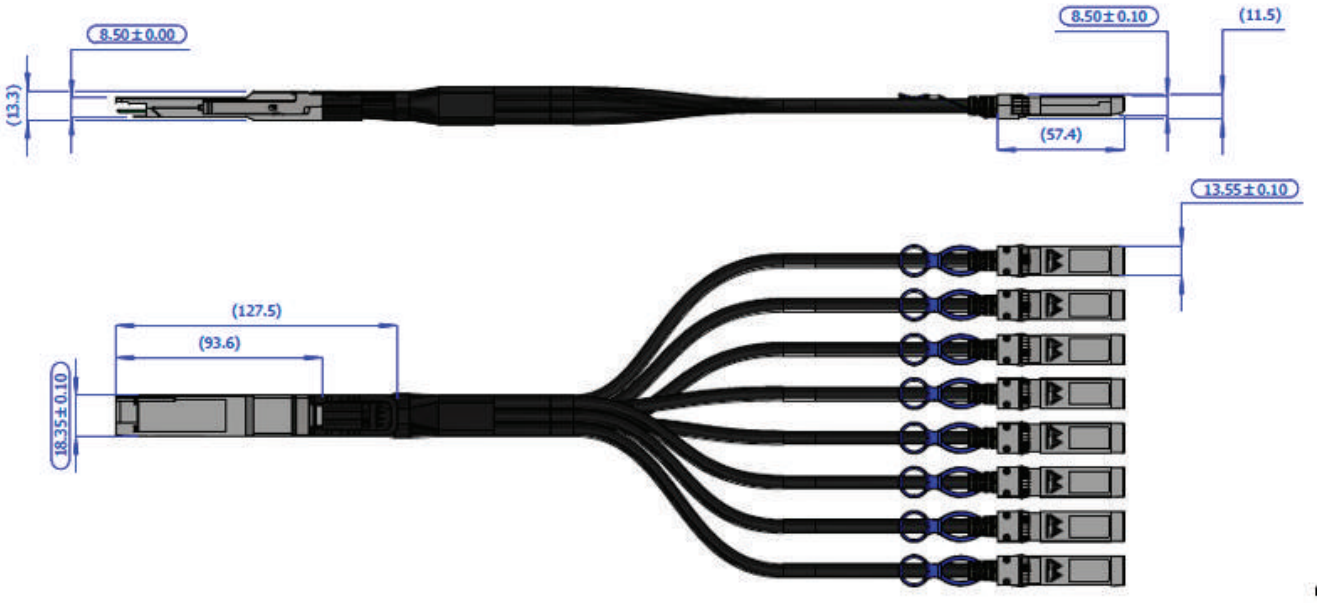
Figure 2. *Cable Length*



All 8 tail lengths are similar.

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Mechanical Schematics



Actual colors of the tails are not shown in the illustration above.

Table 5 - Part Numbers and Descriptions

Part Number	Description
MCP7F80-W001R30	Mellanox® DAC splitter cable, 400GbE, 400Gb/s to 8x50Gb/s, QSFP-DD to 8xSFP56, 1m, 30AWG
MCP7F80-W01AR30	Mellanox® DAC splitter cable, 400GbE, 400Gb/s to 8x50Gb/s, QSFP-DD to 8xSFP56, 1.5m, 30AWG
MCP7F80-W002R26	Mellanox® DAC splitter cable, 400GbE, 400Gb/s to 8x50Gb/s, QSFP-DD to 8xSFP56, 2m, 26AWG
MCP7F80-W02AR26	Mellanox® DAC splitter cable, 400GbE, 400Gb/s to 8x50Gb/s, QSFP-DD to 8xSFP56, 2.5m, 26AWG
MCP7F80-W003R26	Mellanox® DAC splitter cable, 400GbE, 400Gb/s to 8x50Gb/s, QSFP-DD to 8xSFP56, 3m, 26AWG

Notes: xx = reach; yy = wire gauge

Raw cables are provided from different sources to ensure supply chain robustness.

Warranty Information

Mellanox LinkX DAC cables include a 1-year limited hardware warranty, which covers parts repair or replacement.

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INTERCONNECT
PRODUCT BRIEF



100GbE to 2x50GbE (QSFP28 to 2xQSFP28) Direct Attach Copper Splitter Cable

MCP7H00-G0xxxxxxx

Mellanox® MCP7H00-G0xxxxxxx DAC splitter cables[1] are a high speed, cost effective 100GbE to 2x 50GbE Ethernet connectivity solution, designed to meet the growing needs for higher bandwidth in data centers. MCP7H00 cables are compliant with SFF-8665 QSFP28 specifications and provide connectivity between systems with a QSFP28 port on one end and two QSFP28 ports on the other.

The cable connects the data signals from each of the two dual copper pairs on the single QSFP28 (pair 1&2, 3&4) end to the dual copper pair of each of the QSFP28 (pair 1&2) ends on the multiport side. Each QSFP28 port comprises an EEPROM providing product information, which can be read by the host system.

MCP7H00-G0xxxxxxx cables up to 2m support IEEE 802.3by CA-25G-N (Cable Assembly No-FEC) with low latency. Cables with 4m length support IEEE 802.3by CA-25G-L (Cable Assembly Long) with RS-FEC (Reed Solomon Forward Error Correction) enabled. For 2.5m and 3m cables there are two versions supporting either CA-25G-N or CA-25G-L.

Mellanox's unique quality passive copper cable solutions provide power-efficient connectivity for short distance interconnects. It enables higher port bandwidth, density and configurability at a low cost and reduced power requirement in the data centers.

Rigorous cable production testing ensures best out-of-the-box installation experience, performance and durability.

Table 1 - Absolute Maximum Ratings

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
Storage temperature	-40	85	°C

Table 2 - Operational Specifications

Parameter	Min	Typical	Max	Units
Supply voltage (Vcc)	3.135	3.3	3.465	V
Power consumption	--	--	0.1	W
Operating case temperature	0	--	70	°C
Operating relative humidity	5	--	85	%

HIGHLIGHTS

- 100GbE to 2x50GbE data rate
- SFF-8665 compliant QSFP28
- Operating case temperature 0-70°C
- Single 3.3V supply voltage
- Bit Error Rate (BER) better than 1E-15 with Mellanox systems
- Hot pluggable
- RoHS compliant
- LSZH (Low Smoke Zero Halogen) jacket
- LF (Lead Free) HF (Halogen Free) PCB
- SFF-8636 compliant I²C management interface

[1] Raw cables are provided from different sources to ensure supply chain robustness.

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Table 3 - Electrical Specifications

Parameter	Min	Typical	Max	Units
Characteristic impedance	90	100	110	Ω
Time propagation delay (informative)	--	--	4.5	ns/m

Table 4 - Cable Mechanical Specifications

OPN	AWG	Length (m)	Single Cable Diameter	Minimum Bend Radius
MCP7H00-G001R30N	30	1 ± 0.025	5.6 ± 0.35mm	Single bend: 28mm Assembly/repeated bend: 56mm
MCP7H00-G01AR30N		1.5 ± 0.025		
MCP7H00-G002R30N		2 ± 0.050		
MCP7H00-G02AR30L		2.5 ± 0.050		
MCP7H00-G003R30L		3 ± 0.050		
MCP7H00-G02AR26N	26	2.5 ± 0.050	7.4 ± 0.3mm	Single bend: 37mm Assembly/repeated bend: 74mm
MCP7H00-G003R26N		3 ± 0.050		
MCP7H00-G004R26L		4 ± 0.050		

Note 1. See Figure 2 for the cable length definition.

Note 2. The minimum assembly bending radius (close to the connector) is 10x the cable's outer diameter. The repeated bend (far from the connector) is also 10x the cable's outer diameter. The single bend (far from the connector) is 5x the cable's outer diameter.

Figure 1. *Assembly Bending Radius*

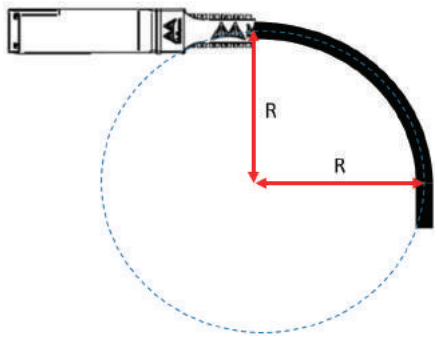


Table 5 - Part Numbers and Descriptions

Part Number	Description
MCP7H00-G001R30N	Mellanox® passive copper hybrid cable, ETH 100Gb/s to 2x50Gb/s, QSFP28 to 2xQSFP28, 1m, Colored, 30AWG, CA-N
MCP7H00-G01AR30N	Mellanox® passive copper hybrid cable, ETH 100Gb/s to 2x50Gb/s, QSFP28 to 2xQSFP28, 1.5m, Colored, 30AWG, CA-N
MCP7H00-G002R30N	Mellanox® passive copper hybrid cable, ETH 100Gb/s to 2x50Gb/s, QSFP28 to 2xQSFP28, 2m, Colored, 30AWG, CA-N
MCP7H00-G02AR30L	Mellanox® passive copper hybrid cable, ETH 100Gb/s to 2x50Gb/s, QSFP28 to 2xQSFP28, 2.5m, Colored, 30AWG, CA-L
MCP7H00-G02AR26N	Mellanox® passive copper hybrid cable, ETH 100Gb/s to 2x50Gb/s, QSFP28 to 2xQSFP28, 2.5m, Colored, 26AWG, CA-N
MCP7H00-G003R30L	Mellanox® passive copper hybrid cable, ETH 100Gb/s to 2x50Gb/s, QSFP28 to 2xQSFP28, 3m, Colored, 30AWG, CA-L
MCP7H00-G003R26N	Mellanox® passive copper hybrid cable, ETH 100Gb/s to 2x50Gb/s, QSFP28 to 2xQSFP28, 3m, Colored, 26AWG, CA-N
MCP7H00-G004R26L	Mellanox® passive copper hybrid cable, ETH 100Gb/s to 2x50Gb/s, QSFP28 to 2xQSFP28, 4m, Colored, 26AWG, CA-L

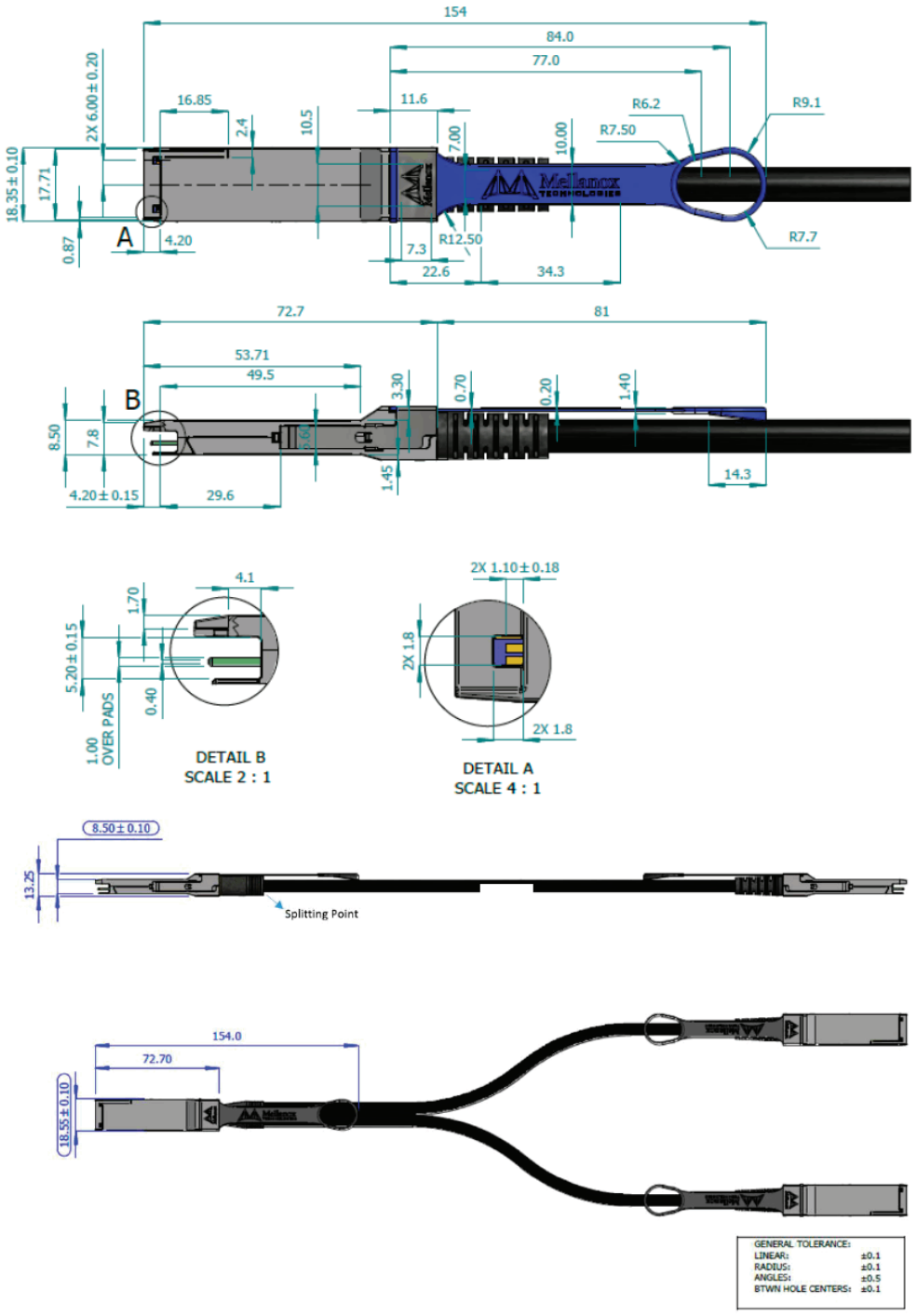
Note 1. See Figure 2 for the cable length definition.

Figure 2. *Cable Length Definition*



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Mechanical Schematics



Warranty Information

Mellanox LinkX DAC cables include a 1-year limited hardware warranty, which covers parts repair or replacement.

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INTERCONNECT
PRODUCT BRIEF



200GbE to 2x100GbE (QSFP56 to 2xQSFP56) Direct Attach Copper Splitter Cable

MCP7H50-Vxxxyzz

LinkX™ CABLES TRANSCEIVERS COMPONENTS †

Mellanox® MCP7H50 passive, copper, splitter cable is a high speed, cost-effective, 200GbE to 2x100GbE Ethernet connectivity solution designed for the growing need for higher bandwidth in data centers.

The 200GbE end is configured as 4 channels x 50G PAM4 in a QSFP56 shell. The 100GbE side splits off 2 channels x 50G PAM4 into two separate QSFP56 ends operating at 100Gb/s. Each QSFP56 cage comprises an EEPROM providing product information which can be read by the host system.

Mellanox's unique, quality, passive, copper, cable solutions provide power-efficient connectivity for short distance interconnects. They enable higher port bandwidth, density and configurability at a low cost and reduced power requirement in the data centers.

Rigorous cable production testing ensures best out-of-the-box installation experience, performance and durability.

Table 1 - Part Numbers and Descriptions

Part Number	Description
MCP7H50-V001R30	Mellanox® passive copper hybrid cable, 200GbE, 200Gb/s to 2x100Gb/s, QSFP56 to 2xQSFP56, colored pulltabs, 1m, 30AWG
MCP7H50-V01AR30	Mellanox® passive copper hybrid cable, 200GbE, 200Gb/s to 2x100Gb/s, QSFP56 to 2xQSFP56, colored pulltabs, 1.5m, 30AWG
MCP7H50-V002R26	Mellanox® passive copper hybrid cable, 200GbE, 200Gb/s to 2x100Gb/s, QSFP56 to 2xQSFP56, colored pulltabs, 2m, 26AWG
MCP7H50-V02AR26	Mellanox® passive copper hybrid cable, 200GbE, 200Gb/s to 2x100Gb/s, QSFP56 to 2xQSFP56, colored pulltabs, 2.5m, 26AWG
MCP7H50-V003R26	Mellanox® passive copper hybrid cable, 200GbE, 200Gb/s to 2x100Gb/s, QSFP56 to 2xQSFP56, colored pulltabs, 3m, 26AWG

Note: xxx = reach; y = pulltab color; zz = wire gauge

HIGHLIGHTS

- 200GbE to 2x100GbE splitter
- Compliant with SFF-8665
- Up to 200Gb/s data rate
- 4x50G PAM4 modulation
- Ultra low crosstalk for improved performance
- Low insertion loss
- Tested in an end-to-end system
- RoHS compliant
- Halogen free
- Operating case temperature of 0-70°C

Warranty Information

Mellanox LinkX DAC cables include a 1-year limited hardware warranty, which covers parts repair or replacement.

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Rev 1.0

INTERCONNECT
PRODUCT BRIEF



400GbE to 2x200GbE (QSFP-DD to 2xQSFP56) Direct Attach Copper Splitter Cable

MCP7H60-W0xxRyy

LinkX †

Mellanox® MCP7H60-W0xxRyy DAC splitter cables are a high speed, cost-effective 400GbE QSFP-DD to 2x200GbE QSFP56 Ethernet connectivity solution, designed to meet the growing needs for higher bandwidth in data centers.

MCP7H60-W0xxRyy cables provide connectivity between systems with a QSFP-DD port on one side and up to two different QSFP56 ports on the other side (8x to two 4x). Each of the ports comprises an EEPROM providing product information, which can be read by the host system.

Mellanox's unique quality passive copper cable solutions provide power-efficient connectivity for short distance interconnects. They enable higher port bandwidth, density and configurability at a low cost and reduced power requirement in the data centers.

Rigorous cable production testing ensures best out-of-the-box installation experience, performance and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply voltage	-0.3	3.6	V
Data input voltage	-0.3	3.6	V
Control input voltage	-0.3	3.6	V
Storage temperature	-40	85	°C

Table 2 - Operational Specifications

Parameter	Minimum	Typical	Maximum	Units
Supply voltage (Vcc)	3.135	3.3	3.465	V
Power consumption	---	---	0.1	W
Operating case temperature	0	---	70	°C
Operating relative humidity	5	---	85	%

Table 3 - Electrical Specifications

Parameter	Minimum	Typical	Maximum	Units
Characteristic impedance	90	100	110	Ω
Time propagation delay (informative)	---	---	4.5	ns/m

Note: Minimum insertion loss for up to 1m cable length is 6dB @ 12.89GHz.

HIGHLIGHTS

- 400GbE to 2x200GbE data rate
- SFF-8636 compliant I²C management interface
- Operating case temperature 0-70°C
- BER (Bit Error Rate) better than 1E-15 with Mellanox end-to-end interconnect
- Hot pluggable
- RoHS compliant
- LSZH (Low Smoke Zero Halogen) jacket
- LF (Lead Free) HF (Halogen Free) PCB

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† For illustration only. Actual products may vary.

Table 4 - Cable Mechanical Specifications

Ordering Part No.	Length Tolerance	AWG	Single Cable Diameter	Minimum Bend Radius	Cable Color & Pulltab Color
MCP7H60-W001R30	1m ± 0.025mm	30	4.5 ± 0.2mm (LSZH)	Single bend: 21mm Assembly/repeated bend: 45mm	Black
MCP7H60-W01AR30	1.5m ± 0.025mm				
MCP7H60-W002R26	2m ± 0.050mm	26	5.8 +0.3/-0.1 mm	Single bend: 29mm Assembly/repeated bend: 58mm	
MCP7H60-W02AR26	2.5m ± 0.050mm				
MCP7H60-W003R26	3m ± 0.050mm				

Note: The minimum assembly bending radius (close to the connector) is 10x the cable's outer diameter. The repeated bend (far from the connector) is also 10x the cable's outer diameter. The single bend (far from the connector) is 5x the cable's outer diameter.

Figure 1. *Assembly Bending Radius*

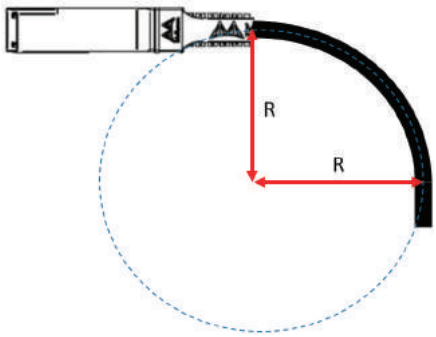
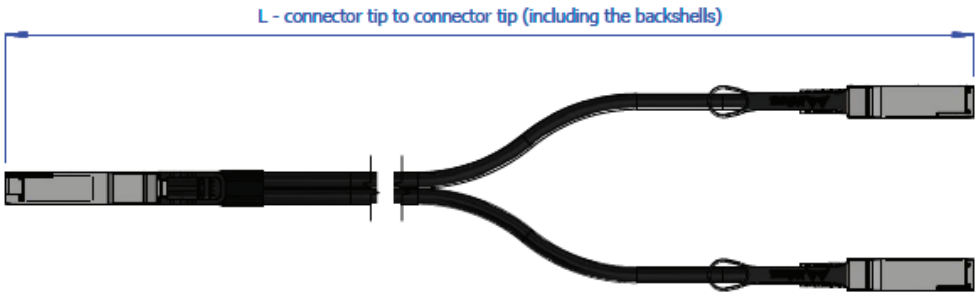


Figure 2. *Cable Length*



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Mechanical Schematics

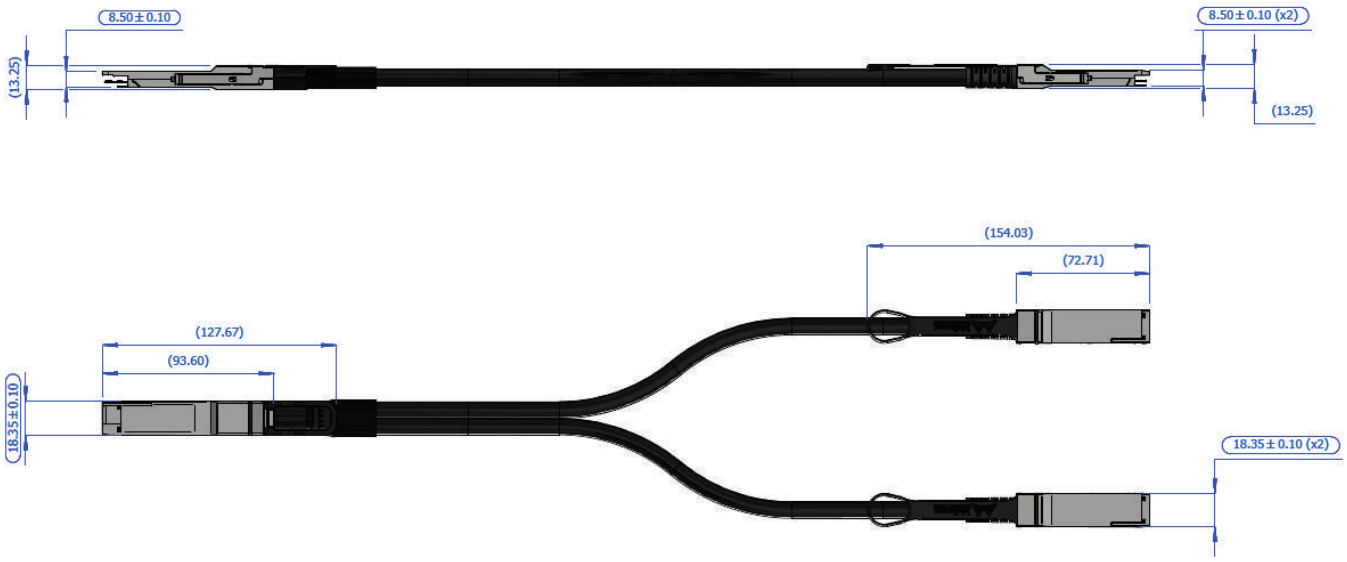


Table 5 - Part Numbers and Descriptions

Part Number	Description
MCP7H60-W001R30	Mellanox® DAC splitter cable, 400GbE, 400Gb/s to 2x200Gb/s, QSFP-DD to 2xQSFP56, 1m, 30AWG
MCP7H60-W01AR30	Mellanox® DAC splitter cable, 400GbE, 400Gb/s to 2x200Gb/s, QSFP-DD to 2xQSFP56, 1.5m, 30AWG
MCP7H60-W002R26	Mellanox® DAC splitter cable, 400GbE, 400Gb/s to 2x200Gb/s, QSFP-DD to 2xQSFP56, 2m, 26AWG
MCP7H60-W02AR26	Mellanox® DAC splitter cable, 400GbE, 400Gb/s to 2x200Gb/s, QSFP-DD to 2xQSFP56, 2.5m, 26AWG
MCP7H60-W003R26	Mellanox® DAC splitter cable, 400GbE, 400Gb/s to 2x200Gb/s, QSFP-DD to 2xQSFP56, 3m, 26AWG

Notes: xx = reach; yy = wire gauge

Raw cables are provided from different sources to ensure supply chain robustness.

Warranty Information

Mellanox LinkX DAC cables include a 1-year limited hardware warranty, which covers parts repair or replacement.

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INTERCONNECT
PRODUCT BRIEF



200GbE to 4x50GbE (QSFP56 to 4xSFP56) Direct Attach Copper Splitter Cable

MCP7H70-V0xxRyy

LinkX †

Mellanox® MCP7H70-V0xxRyy DAC splitter cables are a high speed, cost-effective 200GbE to 4x50GbE Ethernet connectivity solution, designed to meet the growing needs for higher bandwidth in data centers.

MCP7H70-V0xxRyy cables provide connectivity between systems with a QSFP56 port on one side and up to four different SFP56 ports on the other side. The cable connects data signals from each of the four copper pairs on the QSFP56 end to the single pair of each of the SFP56 ends. Each QSFP56/SFP56 port comprises an EEPROM providing product information, which can be read by the host system.

Mellanox's unique quality passive copper cable solutions provide power-efficient connectivity for short distance interconnects. They enable higher port bandwidth, density and configurability at a low cost and reduced power requirement in the data centers.

Rigorous cable production testing ensures best out-of-the-box installation experience, performance and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply voltage	-0.3	3.6	V
Data input voltage	-0.3	3.6	V
Control input voltage	-0.3	3.6	V
Storage temperature	-40	85	°C

Table 2 - Operational Specifications

Parameter	Minimum	Typical	Maximum	Units
Supply voltage (Vcc)	3.135	3.3	3.465	V
Power consumption	---	---	0.1	W
Operating case temperature	0	---	70	°C
Operating relative humidity	5	---	85	%

Table 3 - Electrical Specifications

Parameter	Minimum	Typical	Maximum	Units
Characteristic impedance	90	100	110	Ω
Time propagation delay (informative)	---	---	4.5	ns/m

HIGHLIGHTS

- 200GbE to 4x50GbE data rate
- IEEE 802.3cd PAM4 200GAUI-4, 100GAUI-2 and 50GAUI-1 compliant
- SFF-8636 compliant I²C management interface
- Operating case temperature 0-70°C
- Single 3.3V supply voltage
- BER (Bit Error Rate) better than 1E-15 with Mellanox end-to-end interconnect
- Hot pluggable
- RoHS compliant
- Low Smoke Zero Halogen (LSZH) jacket
- LF (Lead Free) HF (Halogen Free) PCB

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† For illustration only. Actual products may vary.

Table 4 - Cable Mechanical Specifications

Ordering Part No.	Length Tolerance	AWG	Single Cable Diameter	Minimum Bend Radius	Cable Color
MCP7H70-V001R30	1m ± 0.025mm	30	4.8 ± 0.2mm (LSZH)	Single bend: 24mm Assembly/repeated bend: 48mm	Black
MCP7H70-V01AR30	1.5m ± 0.025mm				
MCP7H70-V002R26	2m ± 0.050mm	26	5.1 ± 0.3mm	Single bend: 25.5mm Assembly/repeated bend: 51mm	
MCP7H70-V02AR26	2.5m ± 0.050mm				
MCP7H70-V003R26	3m ± 0.050mm				

Note: The minimum assembly bending radius (close to the connector) is 10x the cable's outer diameter. The repeated bend (far from the connector) is also 10x the cable's outer diameter. The single bend (far from the connector) is 5x the cable's outer diameter.

Figure 1. *Assembly Bending Radius*

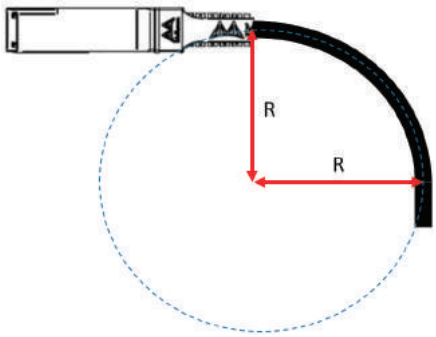
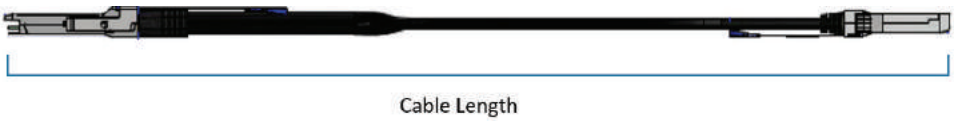
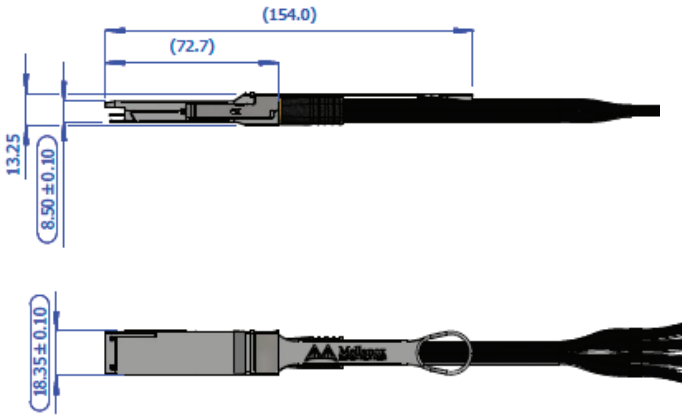


Figure 2. *Cable Length*



Mechanical Schematics - QSFP56 End



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Mechanical Schematics - SFP56 End

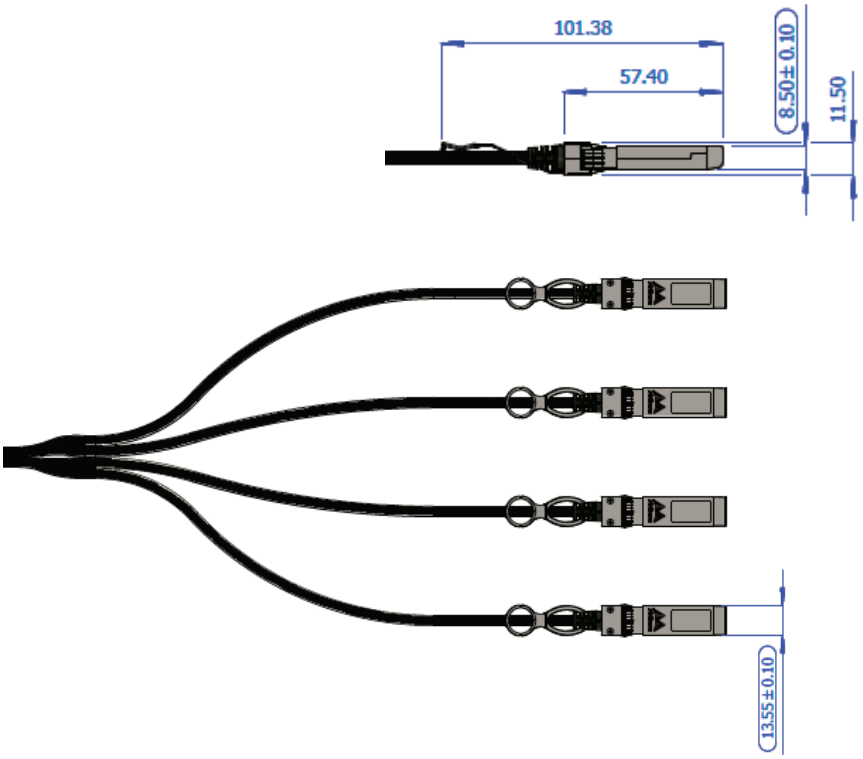


Table 5 - Part Numbers and Descriptions

Part Number	Description
MCP7H70-V001R30	Mellanox® passive copper hybrid cable, 200GbE 200Gb/s to 4x50Gb/s, QSFP56 to 4xSFP56, colored, 1m, 30AWG
MCP7H70-V01AR30	Mellanox® passive copper hybrid cable, 200GbE 200Gb/s to 4x50Gb/s, QSFP56 to 4xSFP56, colored, 1.5m, 30AWG
MCP7H70-V002R26	Mellanox® passive copper hybrid cable, 200GbE 200Gb/s to 4x50Gb/s, QSFP56 to 4xSFP56, colored, 2m, 26AWG
MCP7H70-V02AR26	Mellanox® passive copper hybrid cable, 200GbE 200Gb/s to4x50Gb/s, QSFP56 to 4xSFP56, colored, 2.5m, 26AWG
MCP7H70-V003R26	Mellanox® passive copper hybrid cable, 200GbE 200Gb/s to 4x50Gb/s, QSFP56 to 4x4SFP56, colored, 3m, 26AWG

Notes: xx = reach; yy = wire gauge

Raw cables are provided from different sources to ensure supply chain robustness.

Warranty Information

Mellanox LinkX DAC cables include a 1-year limited hardware warranty, which covers parts repair or replacement.

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INTERCONNECT
PRODUCT BRIEF



100GbE QSFP28 Direct Attach Copper Cable

MCP1600-C0xxEyyz

Mellanox® MCP1600-C0xxEyyz direct attach copper (DAC) cables are high speed, cost-effective alternatives to fiber optics in 100Gb/s Ethernet applications.

Mellanox QSFP28 passive copper cable contains four high-speed copper pairs, each operating at data rates of up to 25GbE. Each QSFP28 connector includes an EEPROM providing product information which can be read by the host system.

Mellanox's unique quality, passive, copper cable solutions provide power-efficient connectivity for short distance interconnects. They enable higher port bandwidth, density and configurability at a low cost and reduced power requirement in the data centers.

MCP1600-C0xxEyyz cables up to 2m support IEEE 802.3bj CA-25G-N (Cable Assembly No-FEC) with low latency. Cables from 3m to 5m support IEEE 802.3bj CA-25G-L (Cable Assembly Long) with RS-FEC (Reed Solomon Forward Error Correction) enabled[1]. For 2.5m and 3m cables there are two versions supporting either CA-25G-N or CA-25G-L.

Mellanox's unique quality passive copper cable solutions provide power-efficient connectivity for short distance interconnects. They enable higher port bandwidth, density and configurability at a low cost and reduced power requirement in the data centers.

Rigorous cable production testing ensures best out-of-the-box installation experience, performance and durability.

Table 1 - Absolute Maximum Ratings

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
Storage temperature	-40	85	°C

Table 2 - Operational Specifications

Parameter	Min	Typical	Max	Units
Supply voltage (Vcc)	3.135	3.3	3.465	V
Power consumption	--	--	0.1	W
Operating case temperature	0	--	70	°C
Operating relative humidity	5	--	85	%

HIGHLIGHTS

- Up to 100GbE data rate
- SFF-8665 compliant QSFP28
- Operating case temperature 0-70°C
- Single 3.3V supply voltage
- Bit Error Rate (BER) better than 1E-15 with Mellanox systems
- Hot pluggable
- RoHS compliant
- LSZH (Low Smoke Zero Halogen) jacket
- LF (Lead Free) HF (Halogen Free) PCB
- SFF-8636 compliant I²C management interface

[1] Raw cables are provided from different sources to ensure supply chain robustness.

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† For illustration only. Actual products may vary.

Table 3 - Electrical Specifications

Parameter	Min	Typical	Max	Units
Characteristic impedance	90	100	110	Ω
Time propagation delay (informative)	--	--	4.5	ns/m

Note 1. Minimum insertion loss for up to 1m cable length is 6dB @ 12.89GHz.

Table 4 - Cable Mechanical Specifications

OPN	AWG	Length (m)	Single Cable Diameter	Minimum Bend Radius	Length Tolerance
MCP1600-C00AE30N	30	0.5	7.1 ± 0.35mm	Single bend: 35.5mm Repetitive and assembly bend: 71mm	±25mm
MCP1600-C001E30N		1			
MCP1600-C01AE30N		1.5			
MCP1600-C002E30N		2			
MCP1600-C02AE30L		2.5			
MCP1600-C003E30L		3			
MCP1600-C02AE26N	26	2.5	9.4 ± 0.4mm	Single bend: 47mm Repetitive and assembly bend: 94mm	±50mm
MCP1600-C003E26N		3			
MCP1600-C005E26L		5			

Note 1. The minimum assembly bending radius (close to the connector) is 10x the cable's outer diameter. The repeated bend (far from the connector) is also 10x the cable's outer diameter. The single bend (far from the connector) is 5x the cable's outer diameter.

Figure 1. *Assembly Bending Radius*

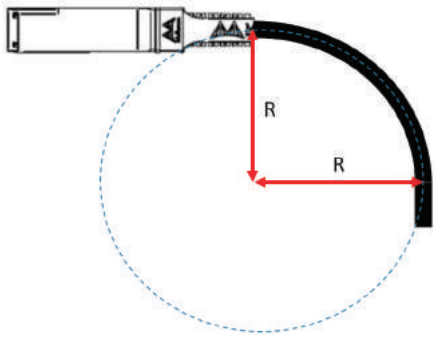
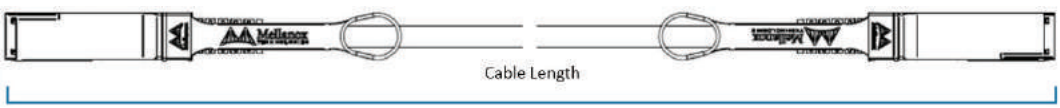


Table 5 - Part Numbers and Descriptions

Part Number	Description
MCP1600-C00AE30N	Mellanox® Passive Copper cable, ETH 100GbE, 100Gb/s, QSFP28, 0.5m, Black, 30AWG, CA-N
MCP1600-C001E30N	Mellanox® Passive Copper cable, ETH 100GbE, 100Gb/s, QSFP28, 1m, Black, 30AWG, CA-N
MCP1600-C01AE30N	Mellanox® Passive Copper cable, ETH 100GbE, 100Gb/s, QSFP28, 1.5m, Black, 30AWG, CA-N
MCP1600-C002E30N	Mellanox® Passive Copper cable, ETH 100GbE, 100Gb/s, QSFP28, 2m, Black, 30AWG, CA-N
MCP1600-C02AE30L	Mellanox® Passive Copper cable, ETH 100GbE, 100Gb/s, QSFP28, 2.5m, Black, 30AWG, CA-L
MCP1600-C02AE26N	Mellanox® Passive Copper cable, ETH 100GbE, 100Gb/s, QSFP28, 2.5m, Black, 26AWG, CA-N
MCP1600-C003E30L	Mellanox® Passive Copper cable, ETH 100GbE, 100Gb/s, QSFP28, 3m, Black, 30AWG, CA-L
MCP1600-C003E26N	Mellanox® Passive Copper cable, ETH 100GbE, 100Gb/s, QSFP28, 3m, Black, 26AWG, CA-N
MCP1600-C005E26L	Mellanox® Passive Copper cable, ETH 100GbE, 100Gb/s, QSFP28, 5m, Black, 26AWG, CA-L

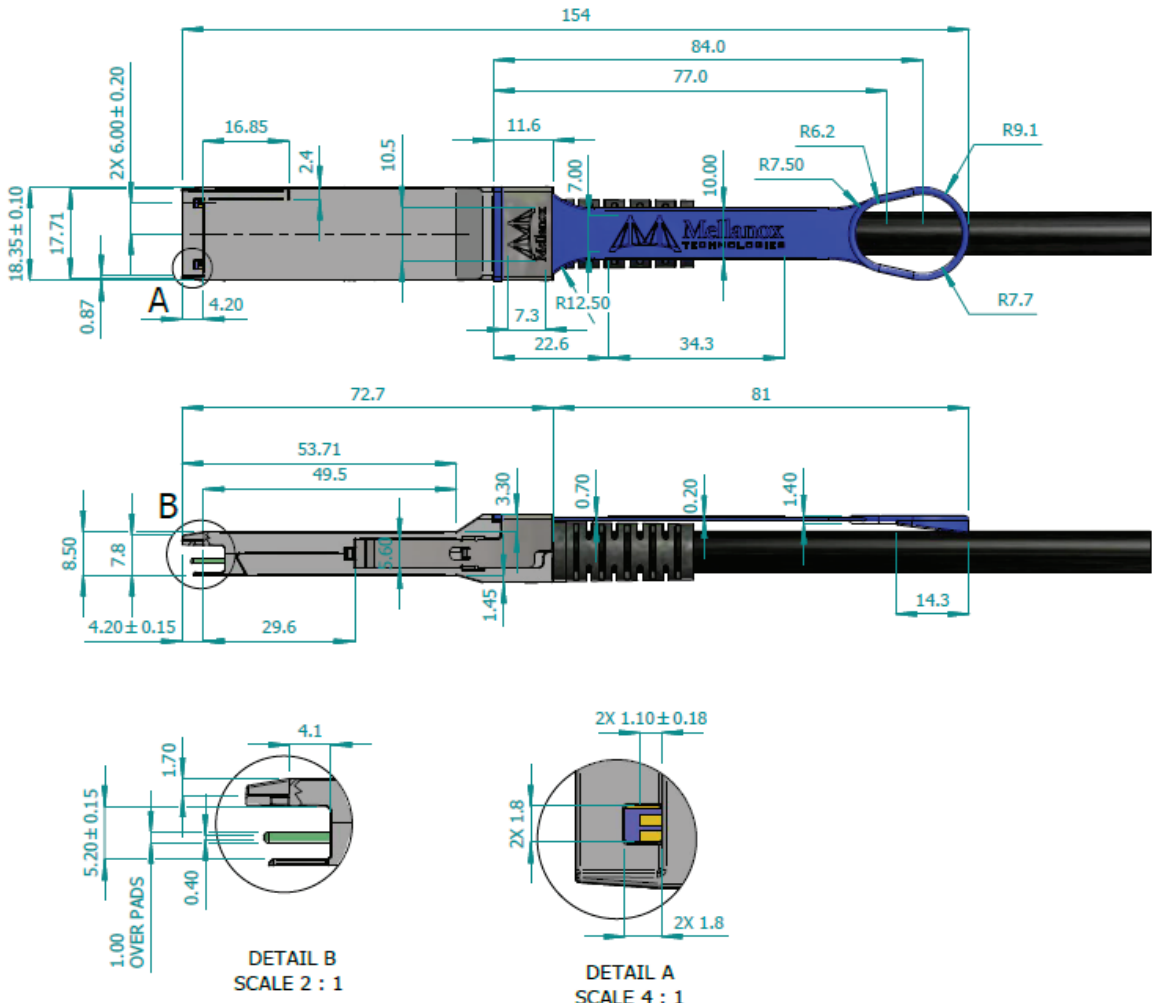
Note 1. See Figure 2 for the cable length definition.
Note 2. xx = reach; yy = wire gauge; z = link code

Figure 2. *Cable Length Definition*



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Mechanical Schematics

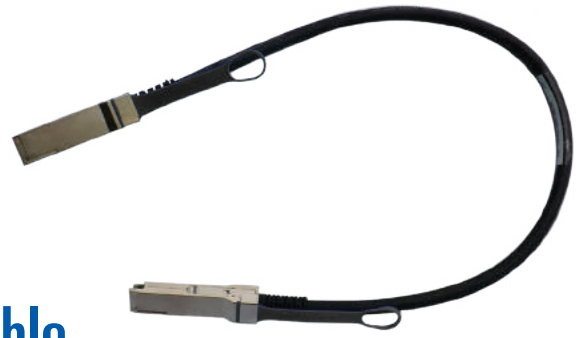


Warranty Information

Mellanox LinkX direct attach copper cables include a 1-year limited hardware warranty, which covers parts repair or replacement.

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200GbE QSFP56 Direct Attach Copper Cable

MCP1650-Vxxxyzz

LinkX™ CABLES TRANSCEIVERS COMPONENTS †

Mellanox® MCP1650 passive DAC cables provide robust connections for leading-edge 200GbE systems. These cables provide 200Gb/s connectivity between devices using QSFP56 ports.

Mellanox's LinkX 200GbE passive DAC cables fill the need for short cost-effective connectivity in the data center. Passive copper cables require no additional power to ensure quality connectivity. Mellanox's high-quality solutions provide a power-efficient replacement for active power connectivity such as fiber optic cables for short distances.

Optimizing systems to operate with Mellanox's LinkX 200GbE passive DAC cables significantly reduces power consumption and EMI emission.

Rigorous cable production testing ensures best out-of-the-box installation experience, performance and durability.

HIGHLIGHTS

- Supports 200GbE Ethernet
- Compliant with SFF-8665
- Up to 200Gb/s data rate
- 4x 50Gb/s PAM4 modulation
- Ultra low crosstalk for improved performance
- Low insertion loss
- Tested in an end-to-end system
- RoHS compliant
- Halogen free
- Operating case temperature of 0-70°C

Table 1 - Part Numbers and Descriptions

Part Number	Description
MCP1650-V00AE30	Mellanox® Passive Copper cable, 200GbE, 200Gb/s, QSFP56, LSZH, 0.5m, black pulltab, 30AWG
MCP1650-V001E30	Mellanox® Passive Copper cable, 200GbE, 200Gb/s, QSFP56, LSZH, 1m, black pulltab, 30AWG
MCP1650-V01AE30	Mellanox® Passive Copper cable, 200GbE, 200Gb/s, QSFP56, LSZH, 1.5m, black pulltab, 30AWG
MCP1650-V002E26	Mellanox® Passive Copper cable, 200GbE, 200Gb/s, QSFP56, LSZH, 2m, black pulltab, 26AWG
MCP1650-V02AE26	Mellanox® Passive Copper cable, 200GbE, 200Gb/s, QSFP56, LSZH, 2.5m, black pulltab, 26AWG
MCP1650-V003E26	Mellanox® Passive Copper cable, 200GbE, 200Gb/s, QSFP56, LSZH, 3m, black pulltab, 26AWG

Note: xxx = reach; y = pulltab color; zz = wire gauge

Warranty Information

Mellanox LinkX DAC cables include a 1-year limited hardware warranty, which covers parts repair or replacement.

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060107PB
Rev 1.0

INTERCONNECT
PRODUCT BRIEF



400GbE QSFP-DD Direct Attach Copper Cable

MCP1660-W0xxEyy

Mellanox® MCP1660-W0xxEyy direct attach copper cables are high speed, cost-effective alternatives to fiber optics in 400GbE Ethernet applications.

Mellanox QSFP-DD passive copper cable[1] contains 16 high-speed copper pairs, each operating at data rates of up to 50Gb/s. Each QSFP-DD port comprises an EEPROM providing product information, which can be read by the host system.

Mellanox's unique quality passive copper cable solutions provide power-efficient connectivity for short distance interconnects. They enable higher port bandwidth, density and configurability at a low cost and reduced power requirement in the data centers.

Rigorous cable production testing ensures best out-of-the-box installation experience, performance and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply voltage	-0.3	3.6	V
Data input voltage	-0.3	3.6	V
Control input voltage	-0.3	3.6	V
Storage temperature	-40	85	°C

Table 2 - Operational Information

Parameter	Minimum	Typical	Maximum	Units
Supply voltage (Vcc)	3.135	3.3	3.465	V
Power consumption	---	---	0.1	W
Operating case temperature	0	---	70	°C
Operating relative humidity	5	---	85	%

Table 3 - Electrical Specifications

Parameter	Minimum	Typical	Maximum	Units
Characteristic impedance	90	100	110	Ω
Time propagation delay (informative)	---	---	4.5	ns/m

HIGHLIGHTS

- Up to 400Gb/s data rate
- 8 x 50Gb/s PAM4 modulation
- QSFP-DD MSA compliant
- Operating case temperature of 0-70°C
- Single 3.3V supply voltage
- Bit Error Rate (BER) better than 1E-15 with Mellanox systems
- Hot pluggable
- RoHS compliant
- LSZH (Low Smoke Zero Halogen) jacket
- LF (Lead Free) HF (Halogen Free) PCB
- SFF-8636 compliant I²C management interface

[1] Raw cables are provided from different sources to ensure supply chain robustness.

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Mechanical Schematics

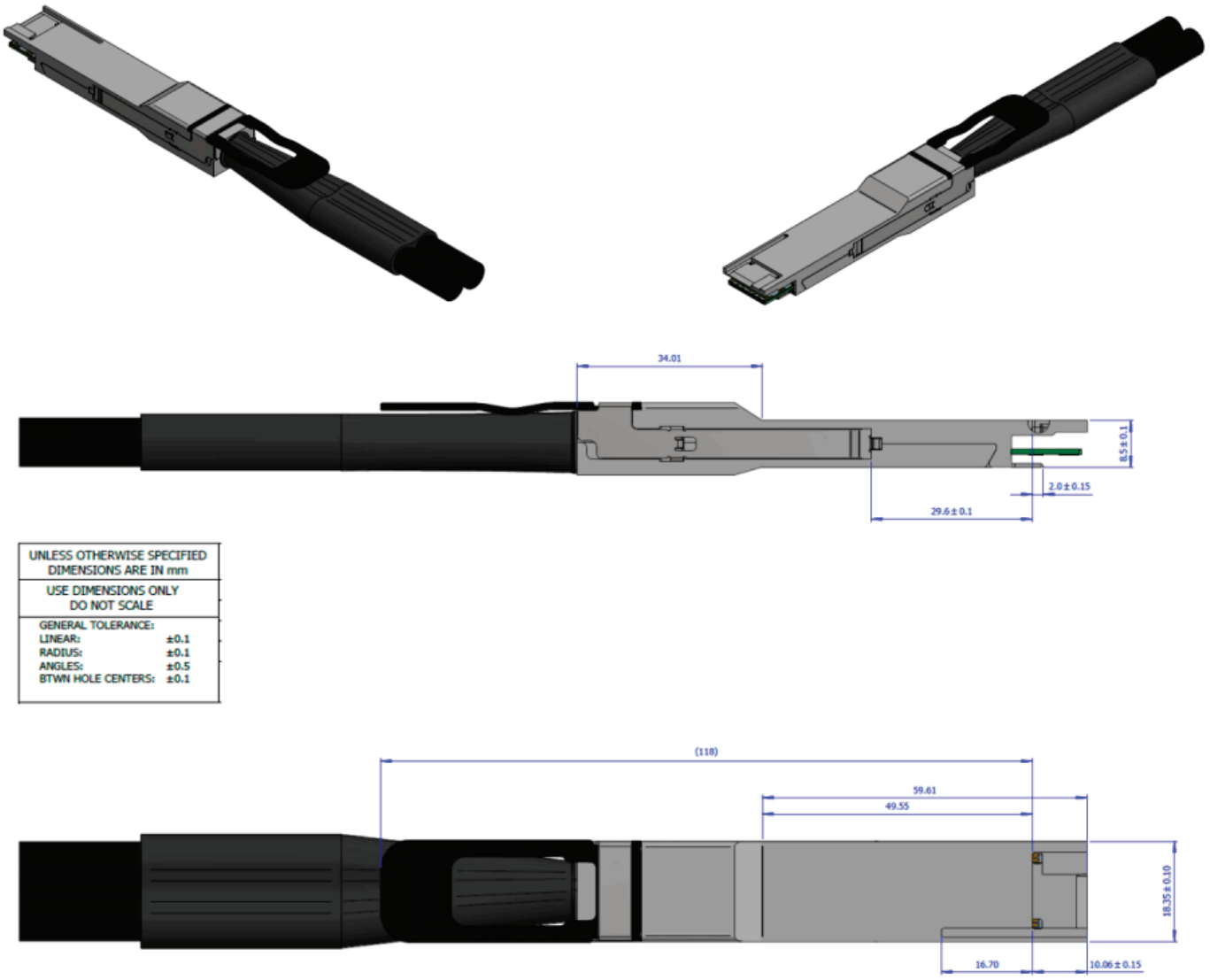
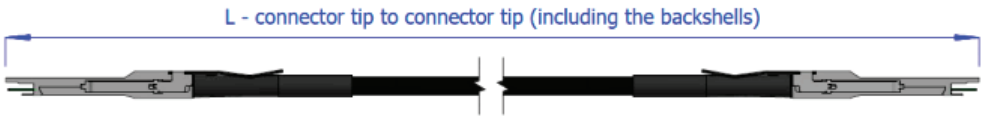


Figure 1. *Cable Length Definition*



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Table 4 - Cable Mechanical Specifications

OPN	AWG	Length (m)	Single Cable Diameter	Minimum Bend Radius
MCP1660-W00AE30	30	0.5 ± 0.025mm	7.1 ± 0.35mm	Single bend: 35.5mm Repetitive and assembly bend: 71mm
MCP1660-W001E30		1 ± 0.025mm		
MCP1660-W01AE30		1.5 ± 0.025mm		
MCP1660-W002E26	26	2 ± 0.050mm	9.4 ± 0.4mm	Single bend: 47mm Repetitive and assembly bend: 94mm
MCP1660-W02AE26		2.5 ± 0.050mm		
MCP1660-W003E26		3 ± 0.050mm		

Note 1. The minimum assembly bending radius (close to the connector) is 10x the cable's outer diameter. The repeated bend (far from the connector) is also 10x the cable's outer diameter. The single bend (far from the connector) is 5x the cable's outer diameter.

Figure 2. *Assembly Bending Radius*

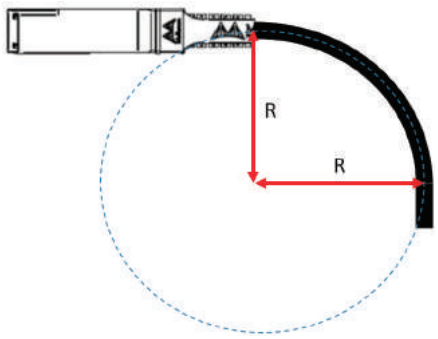


Table 5 - Part Numbers and Descriptions

Part Number	Description
MCP1660-W00AE30	Mellanox® Direct Attach Copper cable, 400GbE, 400Gb/s, QSFP-DD, 0.5m, 30AWG
MCP1660-W001E30	Mellanox® Direct Attach Copper cable, 400GbE, 400Gb/s, QSFP-DD, 1m, 30AWG
MCP1660-W01AE30	Mellanox® Direct Attach Copper cable, 400GbE, 400Gb/s, QSFP-DD, 1.5m, 30AWG
MCP1660-W002E26	Mellanox® Direct Attach Copper cable, 400GbE, 400Gb/s, QSFP-DD, 2m, 26AWG
MCP1660-W02AE26	Mellanox® Direct Attach Copper cable, 400GbE, 400Gb/s, QSFP-DD, 2.5m, 26AWG
MCP1660-W003E26	Mellanox® Direct Attach Copper cable, 400GbE, 400Gb/s, QSFP-DD, 3m, 26AWG

Note 1. See Figure 1 for the cable length definition.
Note 2. xx = reach; yy = wire gauge.

Warranty Information

Mellanox LinkX DAC cables include a 1-year limited hardware warranty, which covers parts repair or replacement.

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060124PB
Rev 1.01



100Gb/s QSFP28 MMF Active Optical Cables

MFA1A00-Cxxx

NVIDIA® Mellanox® MFA1A00-Cxxx are QSFP28 VCSEL-based (Vertical Cavity Surface-Emitting Laser) active optical cables designed for use in 100Gb/s Ethernet systems.

MFA1A00-Cxxx AOC offers high port density and configurability, and a much longer reach than passive copper cables in the data centers. Since the AOC is hot pluggable, it is easy to install and replace.

MFA1A00-Cxxx offers selectable retiming per lane for both its optical transmitters and receivers for the 25Gb/s rate, but the AOC also supports lower bit rates without retiming. The transmitters have programmable input equalizers and input squelch function, while the receivers have programmable output amplitude and pre-emphasis.

These unique-quality active-fiber cable solutions provide power-efficient connectivity for data center interconnects. They enable higher port bandwidth, density and configurability at a low cost and reduced power requirement in the data centers.

Rigorous production testing ensures the best out-of-the-box installation experience, performance and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply voltage	-0.3	3.465	V
Data input voltage	-0.3	3.465	V
Control input voltage	-0.3	4.0	V
Damage threshold	3.4	---	dBm

Table 2 - Operational Specifications

Parameter	Minimum	Typical	Maximum	Units
Supply voltage (Vcc)	3.135	3.3	3.6	V
Power dissipation (each end, no retiming)	---	1.5	1.8	W
Power dissipation (each end, retiming on all lanes)	---	2.2	2.5	W
Supply noise tolerance (10Hz-10MHz)	66	---	---	mVpp
Operating case temperature	0	---	70	°C
Operating relative humidity	5	---	85	%

HIGHLIGHTS

- Up to 100Gb/s data rate
- Programmable Rx output amplitude and pre-emphasis
- Programmable Tx input equalizer
- Selectable retiming
- SFF-8665 compliant QSFP28 port
- Single 3.3V power supply
- 2.2W power dissipation (typ, each end, with retiming)
- BER better than 1E-15
- Up to 100m length
- Hot pluggable
- RoHS compliant
- SFF-8636 compliant I²C management interface

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Mechanical Schematics

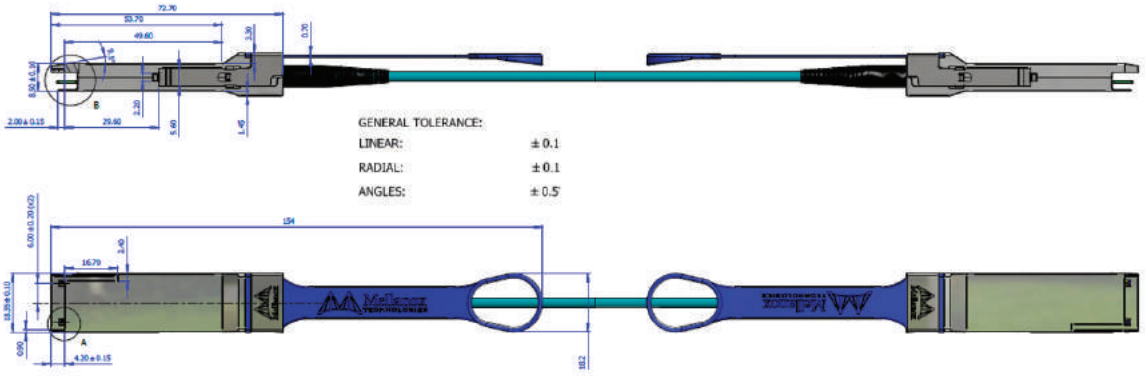


Figure 1. *Cable Length*

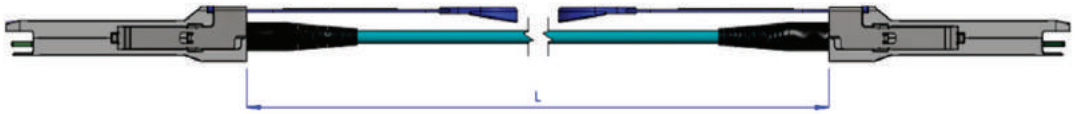


Table 3 - Part Numbers and Descriptions

OPN	Description
MFA1A00-C003	Mellanox® active fiber cable, ETH 100GbE, 100Gb/s, QSFP, LSZH, 3m
MFA1A00-C005	Mellanox® active fiber cable, ETH 100GbE, 100Gb/s, QSFP, LSZH, 5m
MFA1A00-C010	Mellanox® active fiber cable, ETH 100GbE, 100Gb/s, QSFP, LSZH, 10m
MFA1A00-C015	Mellanox® active fiber cable, ETH 100GbE, 100Gb/s, QSFP, LSZH, 15m
MFA1A00-C020	Mellanox® active fiber cable, ETH 100GbE, 100Gb/s, QSFP, LSZH, 20m
MFA1A00-C030	Mellanox® active fiber cable, ETH 100GbE, 100Gb/s, QSFP, LSZH, 30m
MFA1A00-C050	Mellanox® active fiber cable, ETH 100GbE, 100Gb/s, QSFP, LSZH, 50m
MFA1A00-C100	Mellanox® active fiber cable, ETH 100GbE, 100Gb/s, QSFP, LSZH, 100m

Note 1. See Figure 1 for the cable length definition. Note 2. LSZH is an abbreviation for Low Smoke, Zero Halogen jacket.

Warranty Information

LinkX AOC cables include a 1 year limited hardware warranty, which covers parts repair or replacement.

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INTERCONNECT
PRODUCT BRIEF



25GbE SFP28 Active Optical Cable

LinkX™ CABLES TRANSCEIVERS COMPONENTS †

MFA2P10-Axxx | SFP25G-AOCxxM-TG

Mellanox® MFA2P10-Axxx and SFP25G-AOCxxM-TG are SFP28 Active Optical Cables (AOC) designed for use in 25GbE Ethernet systems. These AOCs incorporate Mellanox integrated circuit technology in order to provide high performance at low power.

The AOC offers high port density and configurability, and a much longer reach than passive copper cables in the data centers. Since the AOC is hot pluggable, it is easy to install and replace.

The AOC has a standard SFF-8402 compliant SFP28 port on the electrical side towards the host system. It contains one fiber optic transceiver per end, operating at data rates of up to 25Gb/s.

The AOC offers selectable retiming for both its optical transmitter and receiver for the 25Gb/s rate, but it also supports lower bit rates without retiming. The transmitter has programmable input equalizers and input squelch function, while the receiver has programmable output amplitude and pre-emphasis.

Rigorous production testing ensures the best out-of-the-box installation experience, performance, and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply voltage	-0.3	3.465	V
Data input voltage	-0.3	3.465	V
Control input voltage	-0.3	4	V
Storage temperature	-40	85	°C

Table 2 - Operational Specifications

Parameter	Minimum	Typical	Maximum	Units
Supply voltage (Vcc)	3.135	3.3	3.465	V
Power dissipation (no retiming)	---	0.45	0.5	W
Power dissipation (retiming on)	---	0.7	0.8	W
Supply noise tolerance (10Hz-10MHz)	---	---	66	mVpp
Operating case temperature	0	---	70	°C
Operating relative humidity	5	---	85	%

HIGHLIGHTS

- 0.5W power consumption (typ, each end, with retiming)
- Programmable Tx input equalizer
- Selectable retiming
- SFF-8402 compliant
- 3.3V power supply
- SFP28 power level 1
- BER better than 1E-15
- Hot pluggable
- RoHS compliant
- IEEE 802.3 25GBASE-SR compliant
- IEEE 802.3 10GBASE-SR compliant
- SFF-8472 compliant I²C management interface
- 25G to 10G rate selection by turning off CDR

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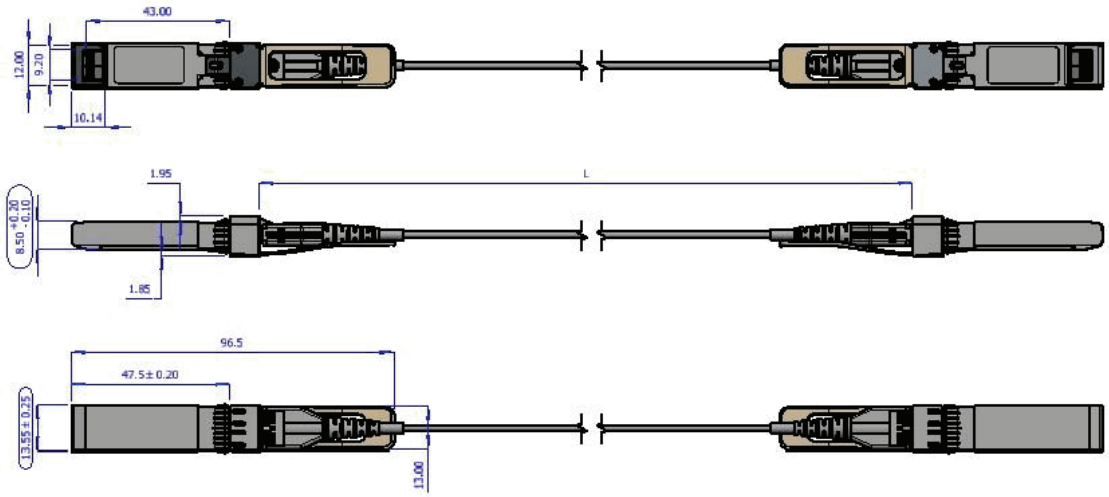
† For illustration only. Actual products may vary.

Table 3 - Cable Mechanical Specifications

Parameter	Value	Units
Diameter	3	mm
Minimum bend radius	30	mm
Length tolerance	Length < 5m: +300mm /-0 5m < Length < 50m: +500mm / -0 50m < Length: +1000mm /-0	m
Cable color	Aqua	---

Note 1. See Figure 1 for the cable length definition.

Mechanical Schematics



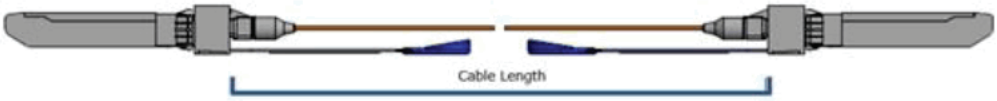


Figure 1. *Cable Length*

Table 4 - Part Numbers and Descriptions

OPN	Description
MFA2P10-A003	Mellanox® active optical cable 25GbE, SFP28, 3m
MFA2P10-A005	Mellanox® active optical cable 25GbE, SFP28, 5m
MFA2P10-A007	Mellanox® active optical cable 25GbE, SFP28, 7m
MFA2P10-A010	Mellanox® active optical cable 25GbE, SFP28, 10m
MFA2P10-A015	Mellanox® active optical cable 25GbE, SFP28, 15m
MFA2P10-A020	Mellanox® active optical cable 25GbE, SFP28, 20m
MFA2P10-A030	Mellanox® active optical cable 25GbE, SFP28, 30m
MFA2P10-A050	Mellanox® active optical cable 25GbE, SFP28, 50m
MFA2P10-A100	Mellanox® active optical cable 25GbE, SFP28, 100m

OPN	Description
SFP25G-AOC03M-TG	Mellanox® customized active optical cable 25GbE, SFP28, 3m, Aqua
SFP25G-AOC05M-TG	Mellanox® customized active optical cable 25GbE, SFP28, 5m, Aqua
SFP25G-AOC07M-TG	Mellanox® customized active optical cable 25GbE, SFP28, 7m, Aqua
SFP25G-AOC10M-TG	Mellanox® customized active optical cable 25GbE, SFP28, 10m, Aqua
SFP25G-AOC20M-TG	Mellanox® customized active optical cable 25GbE, SFP28, 20m, Aqua
SFP25G-AOC30M-TG	Mellanox® customized active optical cable 25GbE, SFP28, 30m, Aqua

Note: The SFP25G-AOCxxM-TG family supports only 25G operation.

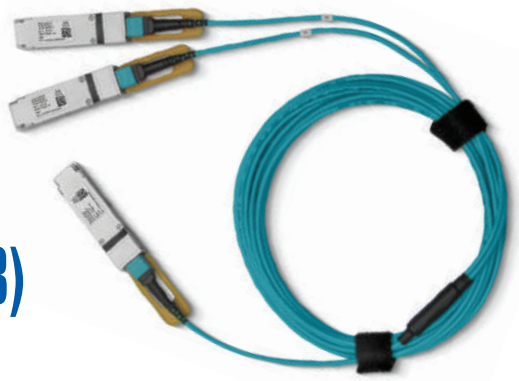
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Warranty Information

Mellanox LinkX active optical cables include a 1-year limited hardware warranty, which covers parts repair or replacement.

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INTERCONNECT
PRODUCT BRIEF



100GbE to 2x50GbE (QSFP28 to 2xQSFP28) MMF Active Optical Splitter Cable

MFA7A20-Cxxx

LinkX™ CABLES TRANSCEIVERS COMPONENTS †

Mellanox® MFA7A20 is a VCSEL-based (Vertical Cavity Surface-Emitting Laser), cost-effective, 100GbE to 2x50GbE, active optical splitter cable (AOC) designed for use in 100GbE Ethernet systems.

The MFA7A20 cable is compliant with SFF-8665 for the QSFP28 pluggable solution. It provides connectivity between system units with a 100GbE connector on one side and two separate 50GbE connectors on the other side, such as a switch and two servers. The cable connects data signals from each of the 4 MMF (Multi Mode Fiber) pairs on the single QSFP28 end to the dual pair of each of the QSFP28 multiport ends. Each QSFP28 end of the cable comprises an EEPROM providing product and status monitoring information, which can be read by the host system.

Mellanox's unique, quality, active, fiber, cable solutions provide power-efficient connectivity for data center interconnects. It enables higher port bandwidth, density and configurability at a low cost, and reduced power requirement in the data centers.

Rigorous cable production testing ensures best out-of-the-box installation experience, performance, and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply voltage	-0.3	3.465	V
Data input voltage	-0.3	3.465	V
Control input voltage	-0.3	4.0	V
Storage temperature	-40	85	°C

Table 2 - Operational Specifications

Parameter	Minimum	Typical	Maximum	Units
Supply voltage (Vcc)	3.145	3.3	3.465	V
Power dissipation (100GbE end no retiming)	---	1.8	2.0	W
Power dissipation (100GbE retiming on all lanes)	---	2.3	2.5	W
Power dissipation (50GbE end no retiming)	---	1.2	1.3	W
Power dissipation (50GbE retiming on all lanes)	---	1.5	1.7	W
Supply noise tolerance (10Hz - 10MHz)	66	---	---	mVpp
Operating case temperature	0	---	70	°C
Operating relative humidity	5	---	85	%

HIGHLIGHTS

- 100GbE to 2x50GbE data rate
- Programmable Rx output amplitude and pre-emphasis
- Programmable Rx output emphasis
- Programmable Tx input equalizer
- Selectable retiming
- SFF-8665 compliant
- 3.3 V power supply
- 2.3/1.5 W power dissipation (typical, with retiming) 100GbE/50GbE
- QSFP28 power class 3/2 100GbE/50GbE
- BER better than 1E-15
- Class 1 laser safety
- Up to 20 meters length
- Hot pluggable
- RoHS compliant
- IEEE 802.3 100GBASE-SR4 compliant
- IEEE 802.3 40GBASE-SR4 compliant
- I²C management interface
- Digital Diagnostic Monitoring (DDM)

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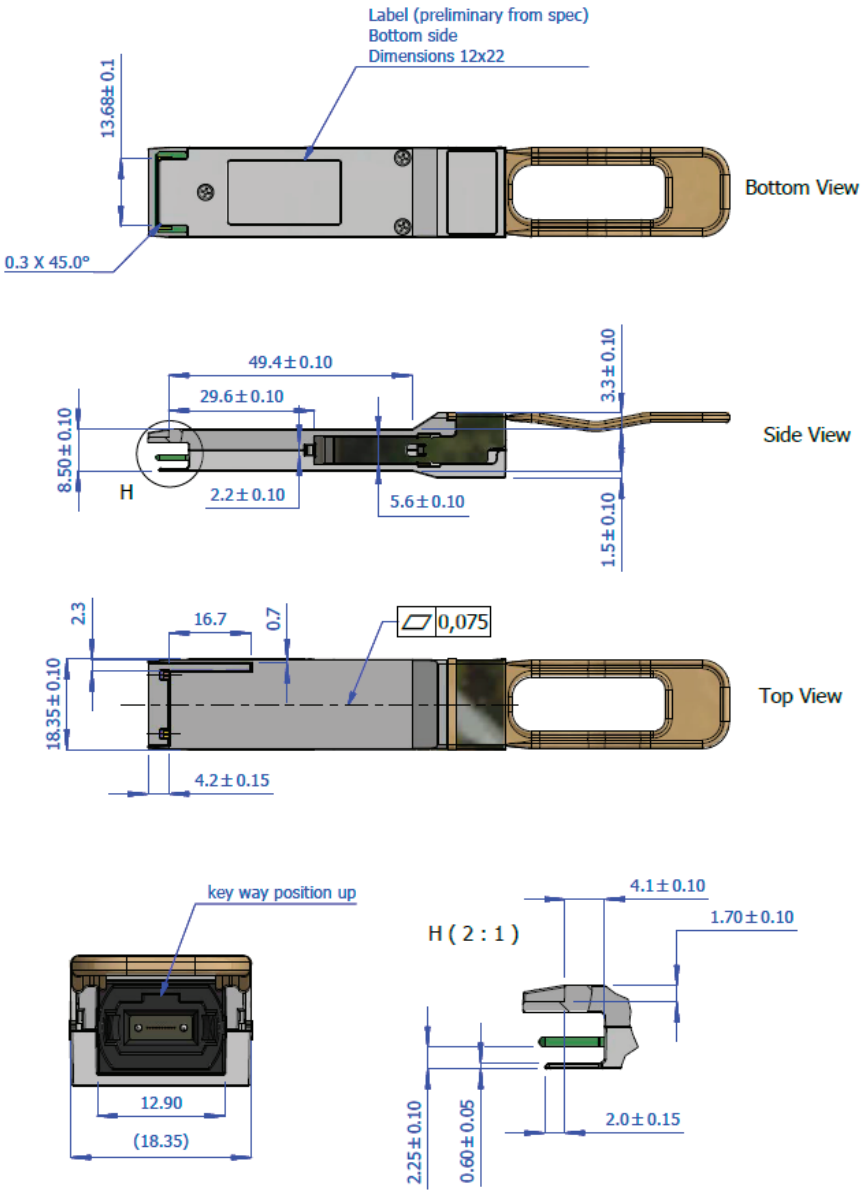
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Table 3 - Electrical Specifications

Parameter	Minimum	Typical	Maximum	Units
Signaling rate	-100 ppm	25.78125	+100 ppm	GBd
Transmitter				
Differential data input swing at TP1a	---	---	900 (1)	mVpp
Differential data output swing at TP4	---	---	480	mVpp
Differential input return loss	Meets equation (83E–5) in IEEE 802.3bm			dB
Differential output return loss	Meets equation (83E–5) in IEEE 802.3bm			dB
Receiver				
Common Mode output return loss	---	---	-6	dB
Output eye width (EW15)	0.57	---	---	UI
Output eye height (EH15)	228	---	---	mV

Note 1. According to IEEE 802.3bm 83E.3.1.2; requires optimization of the input equalizer.

Mechanical Schematics



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Mechanical Schematics (cont.)

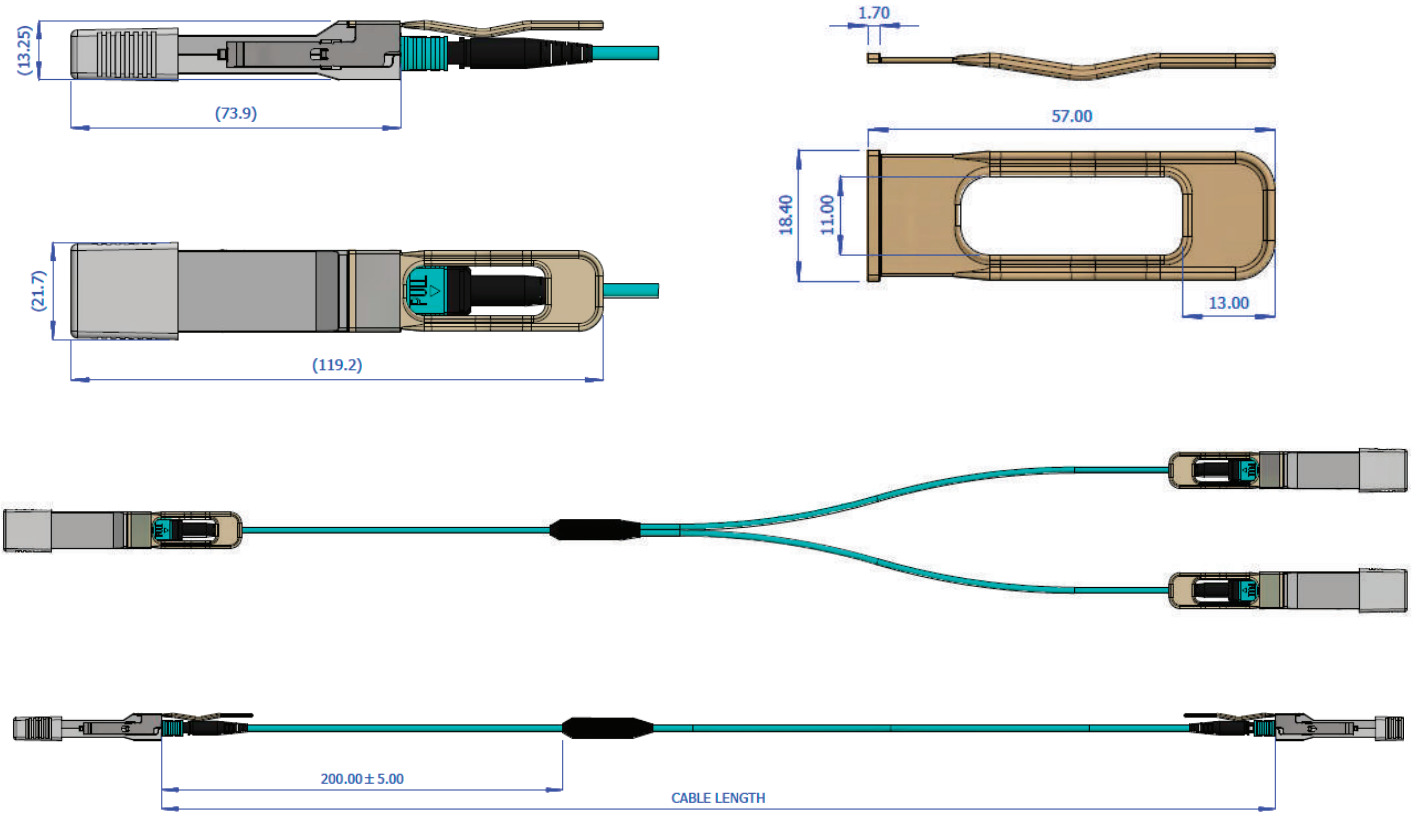


Table 4 - Part Number and Description

OPN	Description
MFA7A20-C003	Mellanox® active fiber hybrid solution, ETH 100GbE to 2x50GbE, QSFP28 to 2xQSFP28, 3m
MFA7A20-C005	Mellanox® active fiber hybrid solution, ETH 100GbE to 2x50GbE, QSFP28 to 2xQSFP28, 5m
MFA7A20-C010	Mellanox® active fiber hybrid solution, ETH 100GbE to 2x50GbE, QSFP28 to 2xQSFP28, 10m
MFA7A20-C020	Mellanox® active fiber hybrid solution, ETH 100GbE to 2x50GbE, QSFP28 to 2xQSFP28, 20m

Warranty Information

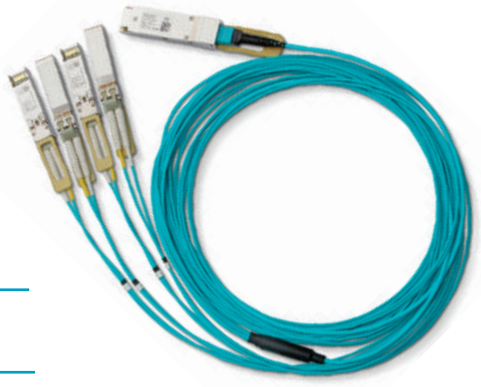
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INTERCONNECT
PRODUCT BRIEF

100GbE to 4x25GbE (QSFP28 to 4xSFP28) MMF Active Optical Splitter Cable



MFA7A50-Cxxx

Mellanox® MFA7A50 is a VCSEL-based (Vertical Cavity Surface-Emitting Laser), cost-effective, 100GbE to 4x25GbE, active optical splitter cable designed for use in 100GbE Ethernet systems.

The MFA7A50 cable is compliant with SFF-8402 for the SFP28 ends and with SFF-8665 for the QSFP28 end. It provides connectivity between system units with a QSFP28 port on one side and up to four different SFP28 ports on the other side, such as a switch and four servers. The cable connects data signals from each of the 4 MMF (Multi Mode Fiber) pairs on the QSFP28 end to the single pair of each of the SFP28 ends. Each QSFP and SFP port comprises an EEPROM providing product and status monitoring information which can be read by the host system.

Mellanox's unique, quality, active, fiber, cable solutions provide power-efficient connectivity for data center interconnects. They enable higher port bandwidth, density and configurability at a low cost, and reduced power requirement in the data centers.

Rigorous cable production testing ensures best out-of-the-box installation experience, performance, and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply voltage	-0.3	3.465	V
Data input voltage	-0.3	3.465	V
Control input voltage	-0.3	4.0	V

Table 2 - Operational Specifications

Parameter	Minimum	Typical	Maximum	Units
Supply voltage (Vcc)	3.145	3.3	3.465	V
Power dissipation (QSFP28 end, no retiming)	---	1.8	2.0	W
Power dissipation (QSFP28 end, retiming both directions)	---	2.3	2.5	W
Power dissipation (SFP28 end, no retiming)	---	0.45	0.5	W
Power dissipation (SFP28 end, both directions)	---	0.7	0.8	W
Supply noise tolerance (10Hz-10MHz)	66	---	---	mVpp
Operating case temperature	0	---	70	°C
Operating relative humidity	5	---	85	%

Table 3 - Cable Mechanical Specifications

Parameter	Value	Units
Diameter	3	mm
Minimum bend radius	30	mm
Length tolerance	Length < 5m: +300/-0 5 m < Length < 30m: +500/-0	mm

HIGHLIGHTS

- 100GbE to 4x25GbE data rate
- Programmable Rx output amplitude and pre-emphasis
- Programmable Tx input equalizer
- Selectable retiming
- SFF-8665 compliant (QSFP end)
- SFF-8402 compliant (SFP ends)
- Single 3.3V power supply
- 2.5W power dissipation (typ., QSFP end, with retiming)
- 0.8W power dissipation (typ., SFP end, with retiming)
- BER better than 1E-15
- Up to 30m length
- Hot pluggable
- RoHS compliant
- I²C management interface

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Mechanical Schematics

Figure 1. *QSFP28 End*

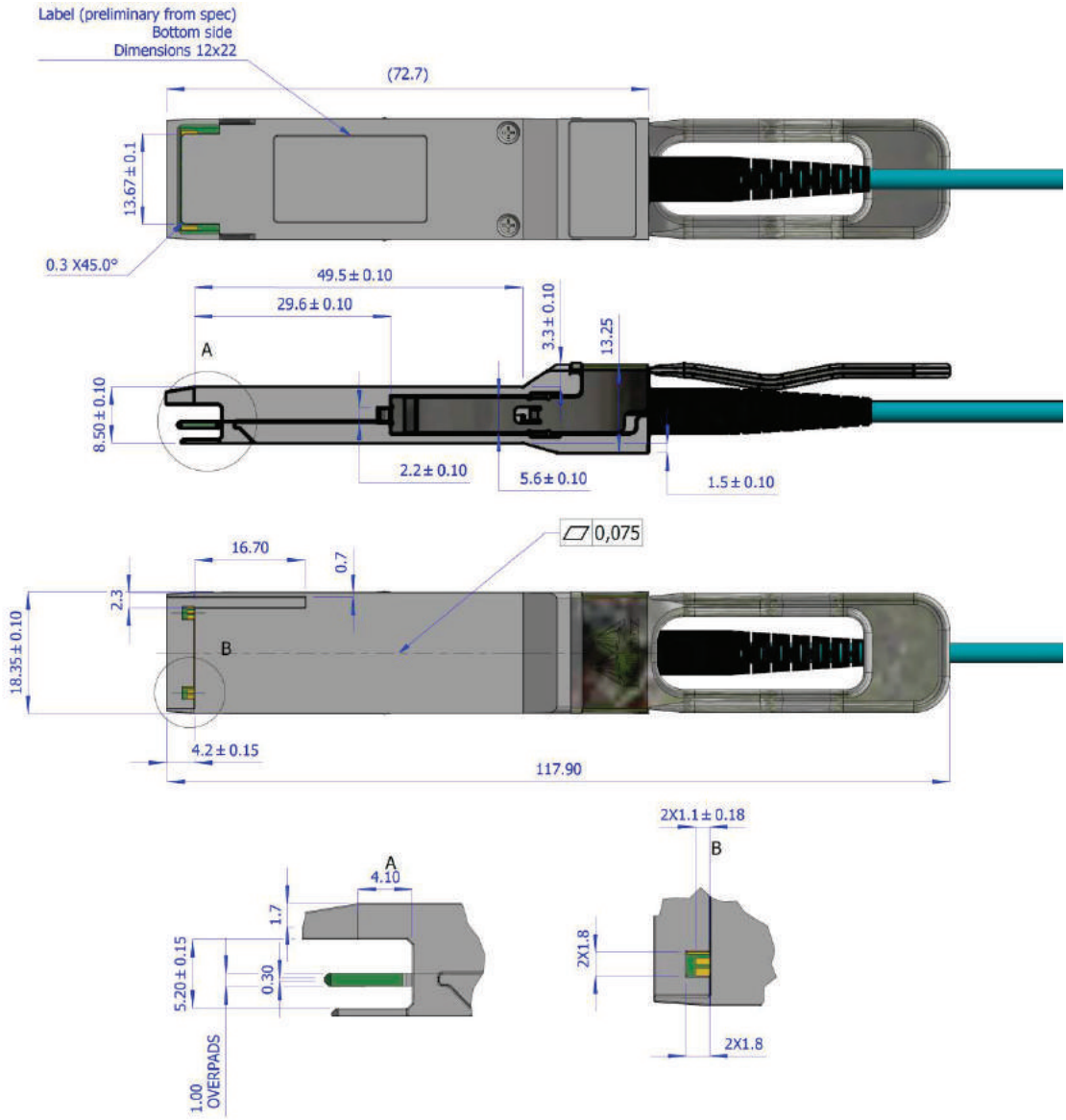
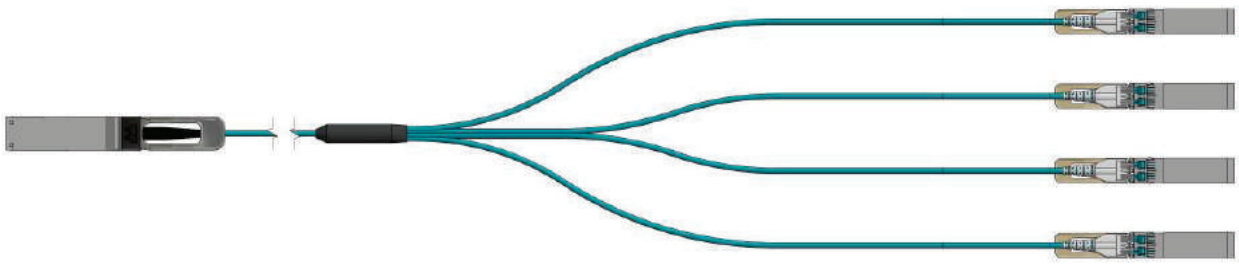


Figure 2. *Full Cable Top View*



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Mechanical Schematics (cont.)

Figure 3. *SFP28 Ends*

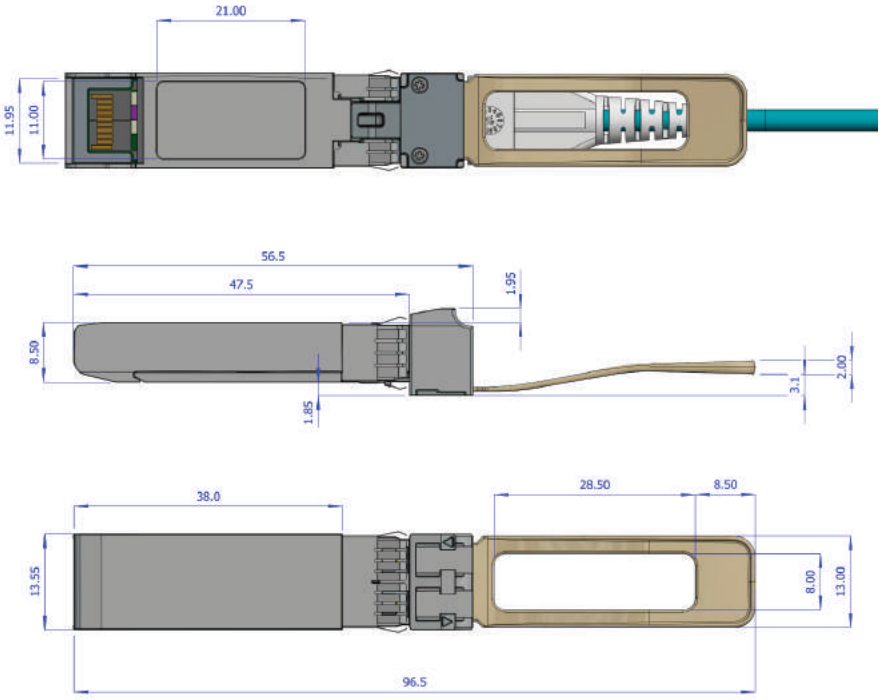


Figure 4. *Cable Length*



Table 4 - Part Numbers and Descriptions

OPN	Description
MFA7A50-C003	Mellanox® active fiber hybrid solution, ETH 100GbE to 4x25GbE, QSFP28 to 4xSFP28, 3m
MFA7A50-C005	Mellanox® active fiber hybrid solution, ETH 100GbE to 4x25GbE, QSFP28 to 4xSFP28, 5m
MFA7A50-C010	Mellanox® active fiber hybrid solution, ETH 100GbE to 4x25GbE, QSFP28 to 4xSFP28, 10m
MFA7A50-C015	Mellanox® active fiber hybrid solution, ETH 100GbE to 4x25GbE, QSFP28 to 4xSFP28, 15m
MFA7A50-C020	Mellanox® active fiber hybrid solution, ETH 100GbE to 4x25GbE, QSFP28 to 4xSFP28, 20m
MFA7A50-C030	Mellanox® active fiber hybrid solution, ETH 100GbE to 4x25GbE, QSFP28 to 4xSFP28, 30m

Note 1. See Figure 4 for the cable length definition.

Warranty Information

Mellanox LinkX AOC cables include a 1 year limited hardware warranty, which covers parts repair or replacement.

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10GbE SFP+ 10GBASE-LR Optical Transceiver

LinkX †

MFM1T02A-LR

The Mellanox® 10.3125Gb/s SFP+ module contains one fiber optic transceiver, operating at data rates of up to 10.3125Gb/s.

Rigorous production testing ensures the best out-of-the-box installation experience, performance, and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply voltage	-0.5	4.0	V
Data input voltage	-0.3	Vcc+0.3	V
Control input voltage	-0.3	Vcc+0.3	V
Damage threshold	3.4	---	dBm
Storage temperature	-40	85	°C

Table 2 - Operational Specifications

Parameter	Minimum	Typical	Maximum	Units
Supply voltage (Vcc)	3.14	3.3	3.46	V
Power consumption	---	---	1	W
Supply noise rejection	Tolerance according to SFF-8431			mVpp
Operating case temperature	0	---	70	°C
Operating relative humidity	0	---	85	%

HIGHLIGHTS

- 10.3125Gb/s data rate
- 1W maximum power consumption
- SFF-8431 and SFF-8432 compliant
- IEEE 802.3ae 10GBASE-LR compliant
- Operating case temperature of 0°C to 70°C
- 3.3V power supply
- BER lower than 1E-15
- Hot pluggable
- Class 1 laser safety
- Maximum link length of 10km
- Duplex LC connector
- RoHS compliant

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Mechanical Schematics

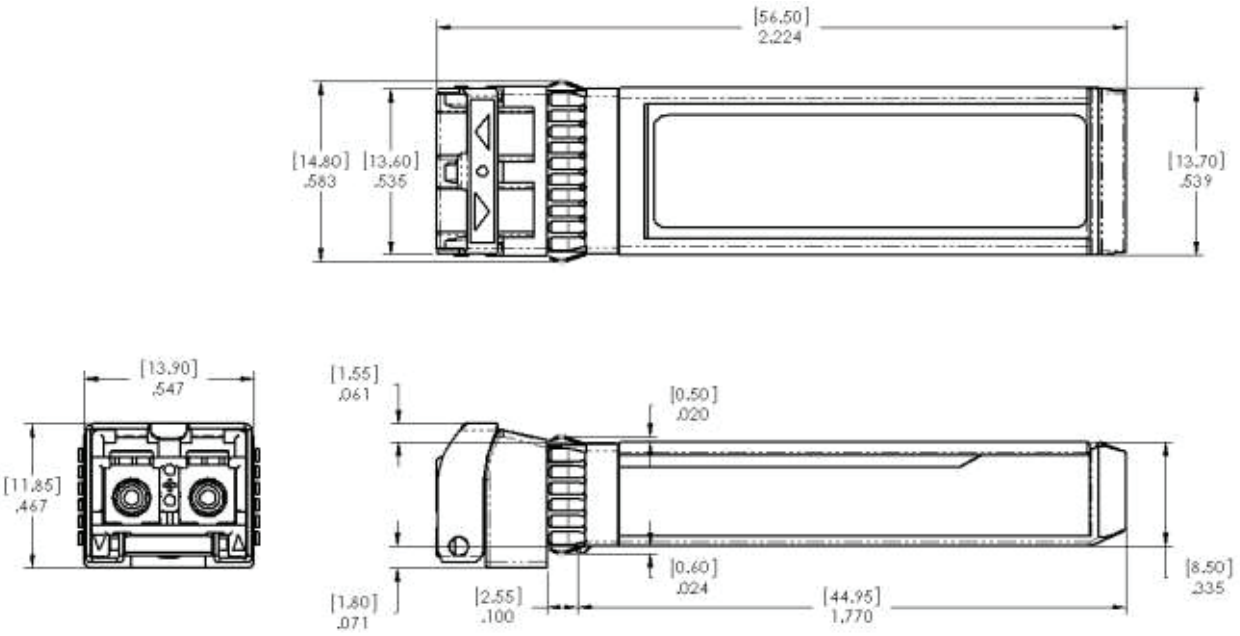


Table 3 - Part Number and Description

OPN	Description
MFM1T02A-LR	Mellanox® SFP+ optical module for 10GBASE-LR

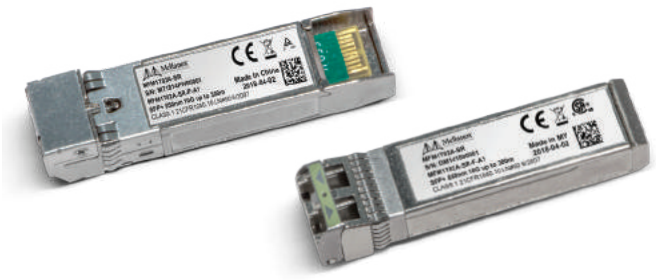
Warranty Information

Mellanox LinkX optical transceivers include a 1-year limited hardware warranty, which covers parts repair or replacement.

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INTERCONNECT
PRODUCT BRIEF



10GbE SFP+ MMF Optical Transceiver

LinkX †

MFM1T02A-SR

The Mellanox® MFM1T02A-SR is a pluggable, SFP+ optical transceiver, designed for use in 10GbE Ethernet systems. The transceiver operates over multi-mode (MMF) fiber, using a nominal wavelength of 850nm, and is SFF-8083 compliant.

MFM1T02A-SR has an IEEE 802.3ae compliant standard SFP+ interface on the electrical side towards the host system. The optical interface is composed of two optical channels/fibers, intended for connection of an MMF cable via a standard LC connectors.

Rigorous production testing ensures the best out-of-the-box installation experience, performance, and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply voltage	-0.3	4.0	V
Data input voltage, Vcc	-0.3	Vcc+0.3	V
Control input voltage	-0.3	Vcc+0.3	V
Storage temperature	-40	85	°C

Table 2 - Operational Specifications

Parameter	Minimum	Typical	Maximum	Units
Supply voltage	3.14	3.3	3.46	V
Power consumption	---	---	1	W
Supply noise rejection	Tolerance according to SFF-8419			
Operating case temperature	0	---	70	°C

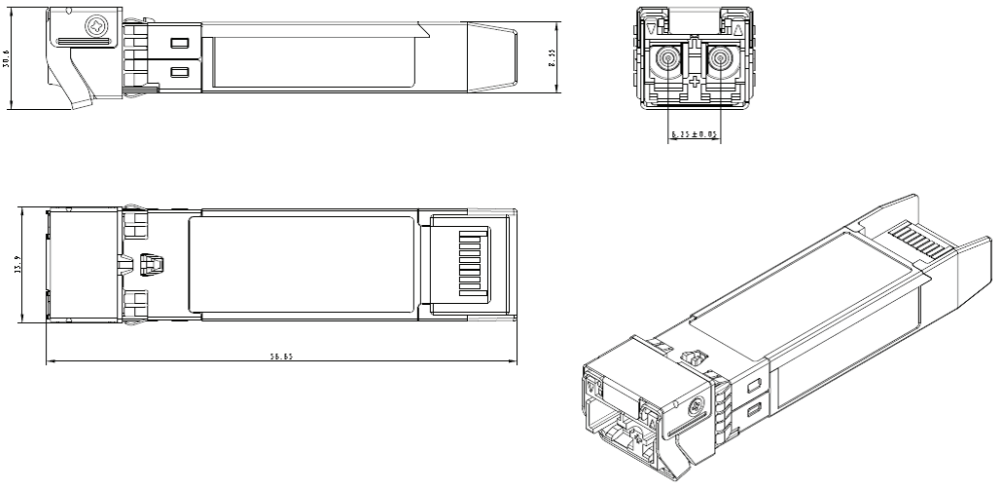
HIGHLIGHTS

- Up to 10.3125Gb/s data rate
- SFF-8083 compliant
- IEEE 802.3ae 10GBASE-SR compliant
- 1W maximum power consumption
- 3.3V power supply
- BER better than 1E-15
- Operating case temperature of 0-70°C
- Hot pluggable
- Class 1 laser safety
- Up to 300m link length on OM3 multimode fiber at 10Gb/s
- Up to 400m link length on OM4 multimode fiber at 10Gb/s
- RoHS compliant
- SFF-8083 compliant management interface
- SFF-8472 compliant digital diagnostic monitoring (DDM)

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Mechanical Schematics (Option 1)



Note: Multiple options are specified to ensure supply chain robustness. The provided option depends on availability and may change from shipment to shipment.

Mechanical Schematics (Option 2)

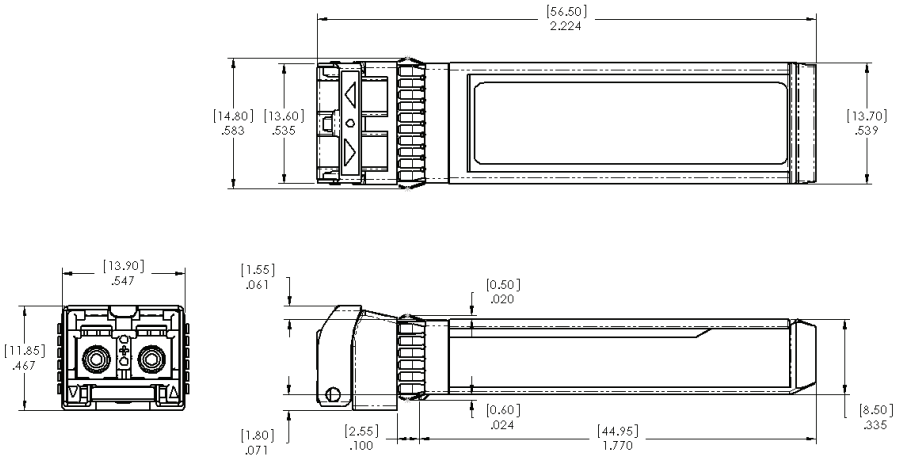


Table 3 - Part Number and Description

OPN	Description
MFM1T02A-SR	Mellanox® optical module, ETH 10GbE, 10Gb/s, SFP+, LC-LC, 850nm, SR up to 300m

Warranty Information

Mellanox LinkX optical transceivers include a 1-year limited hardware warranty, which covers parts repair or replacement.

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INTERCONNECT
PRODUCT BRIEF



200GbE QSFP56 MMF Active Optical Cable

LinkX †

MFS1S00-VxxxE

Mellanox® MFS1S00-VxxxE is a QSFP56 VCSEL-based (Vertical Cavity Surface-Emitting Laser) active optical cable (AOC) designed for use in 200Gb/s Ethernet systems. MFS1S00-VxxxE AOC offers high port density and configurability, and a much longer reach than passive copper cables in the data centers. Since the AOC is hot pluggable, it is easy to install and replace.

MFS1S00-VxxxE has a standard SFF-8665 compliant QSFP56 port on the electrical side towards the host system. It contains four multi-mode fibers (MMF) optic transceivers per end, each operating at data rates of up to 50Gb/s.

MFS1S00-VxxxE offers selectable retiming per lane for both its optical transmitters and receivers up to 50Gbp/s rates.

Rigorous production testing ensures the best out-of-the-box installation experience, performance and durability.

Mellanox's unique quality active fiber cable solutions provide power-efficient connectivity for data center interconnects. They enable higher port bandwidth, density and configurability at a low cost, and reduced power requirement in the data centers.

Table 1 - Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply voltage	-0.3	3.6	V
Data input voltage	-0.3	3.465	V
Control input voltage	-0.3	4.0	V
Damage threshold	3.4	---	dBm
Storage temperature	-40	85	°C

Table 2 - Operational Specifications

Parameter	Minimum	Typical	Maximum	Units
Supply voltage (Vcc)	3.135	3.3	3.465	V
Power dissipation (each end, retiming on all lanes)	---	4.35	4.55	W
Supply noise tolerance (10Hz-10MHz)	66	---	---	mVpp
Operating case temperature	0	---	70 (1)	°C
Operating relative humidity	5	---	85	%

Note 1. Internal temperature readout through DDMI of up to 75°C is allowed.

HIGHLIGHTS

- 200GbE data rate
- 4x 50Gb/s PAM4 modulation
- Programmable Rx output amplitude and pre-emphasis
- SFF-8665 compliant QSFP56 port
- Single 3.3V power supply
- 4.35W power dissipation (typ., each end, with retiming)
- Enables BER (Bit Error Rate) better than 1E-15 with Mellanox systems
- Up to 100m length
- Hot pluggable
- RoHS compliant
- SFF-8636 compliant I²C management interface

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† For illustration only. Actual products may vary.

Table 3 - Cable Mechanical Specifications

Parameter	Value		Units
Diameter	3 ± 0.2		mm
Minimum bend radius	30		mm
Length tolerance	Length < 5m:	+300mm /-0	m
	5m ≤ Length < 50m:	+500mm /-0	
	50m ≤ Length:	+1000mm /-0	
Cable color	Aqua		--

Note 1. See Figure 1 for the cable length definition.

Mechanical Schematics

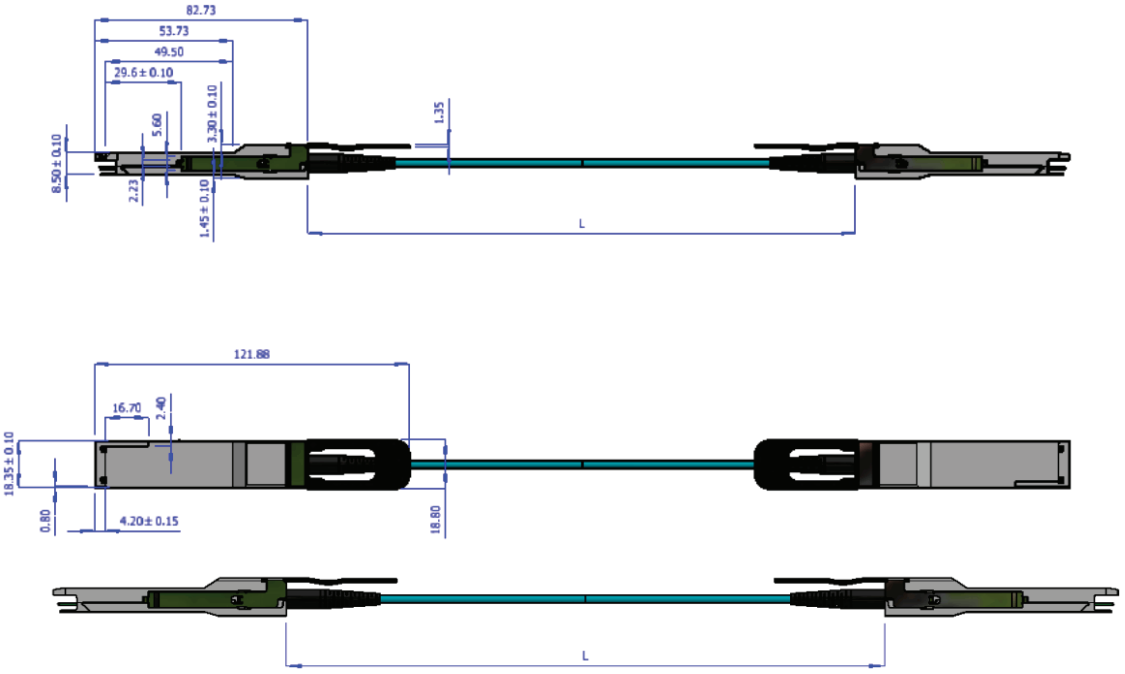


Figure 1. *Cable Length*

Table 4 - Part Numbers and Descriptions

Part Number	Description
MFS1S00-V003E	Mellanox® active fiber cable, 200GbE, 200Gb/s, QSFP56, LSZH, black pulltab, 3m
MFS1S00-V005E	Mellanox® active fiber cable, 200GbE, 200Gb/s, QSFP56, LSZH, black pulltab, 5m
MFS1S00-V010E	Mellanox® active fiber cable, 200GbE, 200Gb/s, QSFP56, LSZH, black pulltab, 10m
MFS1S00-V015E	Mellanox® active fiber cable, 200GbE, 200Gb/s, QSFP56, LSZH, black pulltab, 15m
MFS1S00-V020E	Mellanox® active fiber cable, 200GbE, 200Gb/s, QSFP56, LSZH, black pulltab, 20m
MFS1S00-V030E	Mellanox® active fiber cable, 200GbE, 200Gb/s, QSFP56, LSZH, black pulltab, 30m
MFS1S00-V050E	Mellanox® active fiber cable, 200GbE, 200Gb/s, QSFP56, LSZH, black pulltab, 50m
MFS1S00-V100E	Mellanox® active fiber cable, 200GbE, 200Gb/s, QSFP56, LSZH, black pulltab, 100m

Warranty Information

Mellanox LinkX AOC cables include a 1-year limited hardware warranty, which covers parts repair or replacement.

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200GbE to 2x100GbE (QSFP56 to 2xQSFP56) MMF Active Optical Splitter Cable

MFS1S50-VxxxE

Mellanox® MFS1S50-VxxxE is a QSFP56 VCSEL-based (Vertical Cavity Surface-Emitting Laser), cost-effective 200GbE to 2 x 100GbE active optical splitter cable (AOC) designed for use in 200GbE Ethernet systems.

The MFS1S50-VxxxE cable is compliant with SFF-8665 for the QSFP56 pluggable solution. It provides connectivity between system units with a 200GbE connector on one side and two separate 100GbE connectors on the other side, such as a switch and two servers. The cable connects data signals from each of the 4 MMF (Multi Mode Fiber) pairs on the single QSFP56 end to the dual pair of each of the QSFP56 multiport ends. Each QSFP56 end of the cable contains an EEPROM providing product and status monitoring information, which can be read by the host system.

Rigorous production testing ensures the best out-of-the-box installation experience, performance and durability.

Mellanox's unique quality active fiber cable solutions provide power-efficient connectivity for data center interconnects. They enable higher port bandwidth, density and configurability at a low cost, and reduced power requirement in the data centers.

Table 1 - Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply voltage	-0.3	3.6	V
Data input voltage	-0.3	3.465	V
Control input voltage	-0.3	4.0	V
Damage threshold	3.4	---	dBm
Storage temperature	-40	85	°C

Table 2 - Operational Specifications

Parameter	Minimum	Typical	Maximum	Units
Supply voltage (Vcc)	3.135	3.3	3.465	V
Power dissipation 200Gb/s end	---	4.35	4.55	W
Power dissipation 100Gb/s end	---	2.50	2.75	W
Supply noise tolerance (10Hz-10MHz)	66	---	---	mVpp
Operating case temperature	0	---	70 (1)	°C
Operating relative humidity	5	---	85	%

Note 1. Internal temperature readout through DDMI of up to 75°C is allowed.

HIGHLIGHTS

- 200GbE to 2x100GbE data rate
- 4x 50Gb/s PAM4 modulation
- Programmable Rx output amplitude and pre-emphasis
- SFF-8665 compliant QSFP56 port
- Single 3.3V power supply
- 4.35W power dissipation (typ., 200G end)
- Bit Error Rate (BER) better than 1E-15 with Mellanox systems
- Up to 30m length
- Hot pluggable
- RoHS compliant
- IEEE 802.3 200GBASE-SR4 and 100GBASE-SR2 compliant
- SFF-8636 compliant I²C management interface

† For illustration only. Actual products may vary.

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Table 3 - Cable Mechanical Specifications

Parameter	Value	Units
Diameter	3 ± 0.2	mm
Minimum bend radius	30	mm
Length tolerance	Length < 5m: +300mm / -0 5m ≤ Length < 50m: +500mm / -0 50m ≤ Length: +1000mm / -0	m, mm
Cable color	Aqua	---

Note 1. See Figure 1 for the cable length definition.

Mechanical Schematics

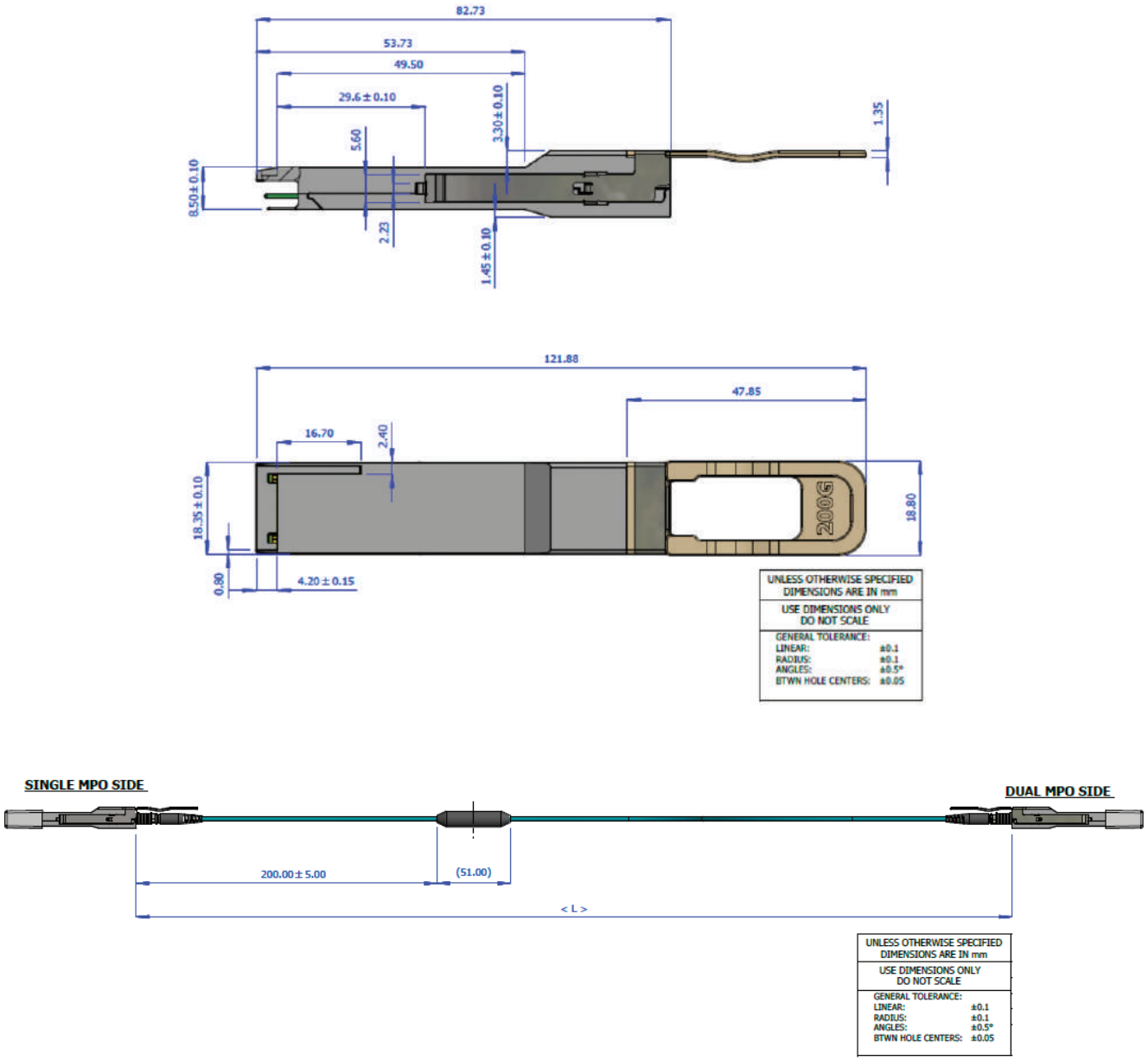


Figure 1. *Splicing Point and Cable Length*

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Table 4 - Part Numbers and Descriptions

Part Number	Description
MFS1S50-V003E	Mellanox® active fiber cable, 200GbE, 200Gb/s, QSFP56, LSZH, 3m
MFS1S50-V005E	Mellanox® active fiber cable, 200GbE, 200Gb/s, QSFP56, LSZH, 5m
MFS1S50-V010E	Mellanox® active fiber cable, 200GbE, 200Gb/s, QSFP56, LSZH, 10m
MFS1S50-V015E	Mellanox® active fiber cable, 200GbE, 200Gb/s, QSFP56, LSZH, 15m
MFS1S50-V020E	Mellanox® active fiber cable, 200GbE, 200Gb/s, QSFP56, LSZH, 20m
MFS1S50-V030E	Mellanox® active fiber cable, 200GbE, 200Gb/s, QSFP56, LSZH, 30m

Warranty Information

Mellanox LinkX AOC cables include a 1-year limited hardware warranty, which covers parts repair or replacement.

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Rev 1.22

INTERCONNECT
PRODUCT BRIEF



40GbE QSFP+ SR4 Optical Transceiver

MMA1B00-B150D

LinkX™ CABLES TRANSCEIVERS COMPONENTS †

Mellanox® MMA1B00-B150D is a 4-channel, pluggable, QSFP+, VCSEL-based (Vertical Cavity Surface Emitting Laser) optical transceiver designed for up to 150m reach in 40Gb/s Ethernet networks operating at 4x10.3125Gb/s. This transceiver incorporates Mellanox integrated circuit technology, which combines high performance at low power. The transceiver operates over parallel multi-mode fiber (MMF), using a nominal wavelength of 850nm, and is SFF-8436 compliant.

The MMA1B00-B150D transceiver has a standard QSFP+ connector on the electrical side towards the host system for power, control/monitoring and high-speed data. The optical interface is composed of four optical channels/fibers in each direction, intended for a parallel MMF cable via a standard MPO connector. The transceiver can operate 10.3125Gb/s without retiming.

The transceiver provides digital diagnostic monitoring of supply voltage, temperature, transmit/receive power, and VCSEL bias.

Rigorous production testing ensures the best out-of-the-box installation experience, performance, and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Min	Max	Units
Supply voltage	-0.3	3.6	V
Data input voltage	-0.3	3.465	V
Control input voltage	-0.3	4	V
Damage threshold [a]	3.4	--	dBm
Storage temperature	-40	85	°C

Note a: The receiver may not operate correctly at this input power level.

Table 2 - Operational Information

Parameter	Min	Typical	Max	Units
Supply voltage	3.135	3.3	3.465	V
Power dissipation	--	1.3	1.5	W
Supply noise tolerance (10Hz-10MHz)	66	--	--	mVpp
Operating case temperature	0	--	70	°C
Operating relative humidity	5	--	85	%RH

HIGHLIGHTS

- 40GbE (4x10GbE) Ethernet
- Programmable Tx input equalizer
- Programmable Rx output amplitude
- Programmable Rx output emphasis
- SFF-8436 compliant QSFP+
- Single 3.3V supply
- QSFP+ power class 1
- BER better than 1E-15
- Class 1 laser safety
- Up to 150m on OM4 and 100m on OM3 multi-mode fiber
- Digital diagnostic monitoring (DDM)
- Hot pluggable
- RoHS compliant
- IEEE 802.3 40GBASE-SR4 compliant
- SFF-8636 compliant I²C management interface

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† For illustration only. Actual products may vary.

Mechanical Schematics

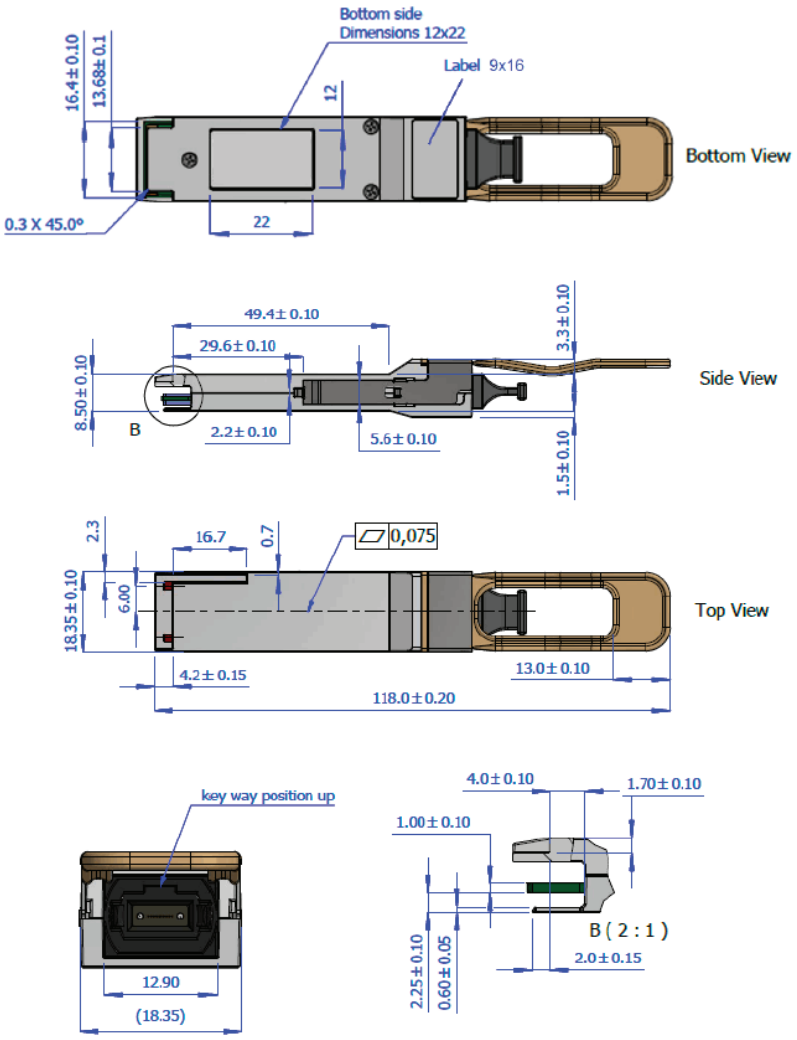


Table 3 - Part Number and Description

OPN	Description
MMA1B00-B150D	Mellanox® transceiver, 40GbE, QSFP+, MPO, 850nm, SR4, up to 150m, DDMI

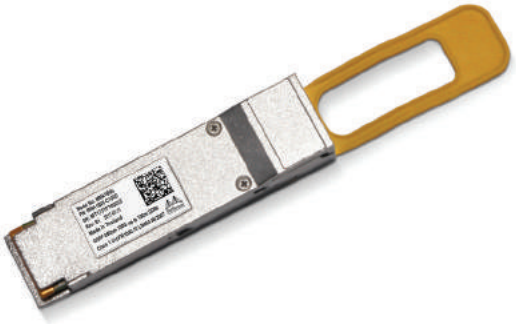
Warranty Information

Mellanox LinkX optical transceivers include a 1-year limited hardware warranty, which covers parts repair or replacement.

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INTERCONNECT
PRODUCT BRIEF



100 GbE SR4 QSFP28 MMF Optical Transceiver

MMA1B00-C100D

LinkX †

NVIDIA® Mellanox® MMA1B00-C100D is a 4-channel, pluggable, QSFP28, optical transceiver designed for use in 100 GbE Ethernet links with up to 100 m reach on multi-mode fiber (MMF). This transceiver incorporates Mellanox integrated circuit technology, in order to provide high performance at low power.

MMA1B00-C100D converts 4 input channels of 25 Gb/s electrical data to 4 optical signals at 850 nm. Reversely, the receiver side de-multiplexes 4 optical inputs into 4 electrical differential output signals.

MMA1B00-C100D has selectable retiming as specified in the SFF-8636 MSA. This enables the transceiver to be used in both 40 GbE and 100 GbE applications.

Digital diagnostic monitoring functions for temperature, supply voltage, and optical power are available via the two-wire (I^2C) management interface, as specified by the QSFP28 MSA.

The optical interface is a multi-fiber push-on (MPO) connector with the 4 optical channels/fibers in each direction. The MPO connector is the un-angled (UPC) type.

Rigorous production testing ensures the best out-of-the-box installation experience, performance, and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply voltage	-0.3	3.6	V
Data input voltage	-0.3	3.465	V
Control input voltage	-0.3	4	V
Damage threshold	3.4	--	dBm
Storage temperature	-40	85	°C

Table 2 - Operational Information

Parameter	Minimum	Typical	Maximum	Units
Supply voltage	3.135	3.3	3.465	V
Power dissipation (no retiming)	--	1.5	1.8	W
Power dissipation (retiming on all lanes)	--	2.2	2.5	W
Supply noise tolerance (10 Hz - 10 MHz)	66	--	--	mVpp
Operating case temperature	0	--	70	°C
Operating relative humidity	5	--	85	%RH

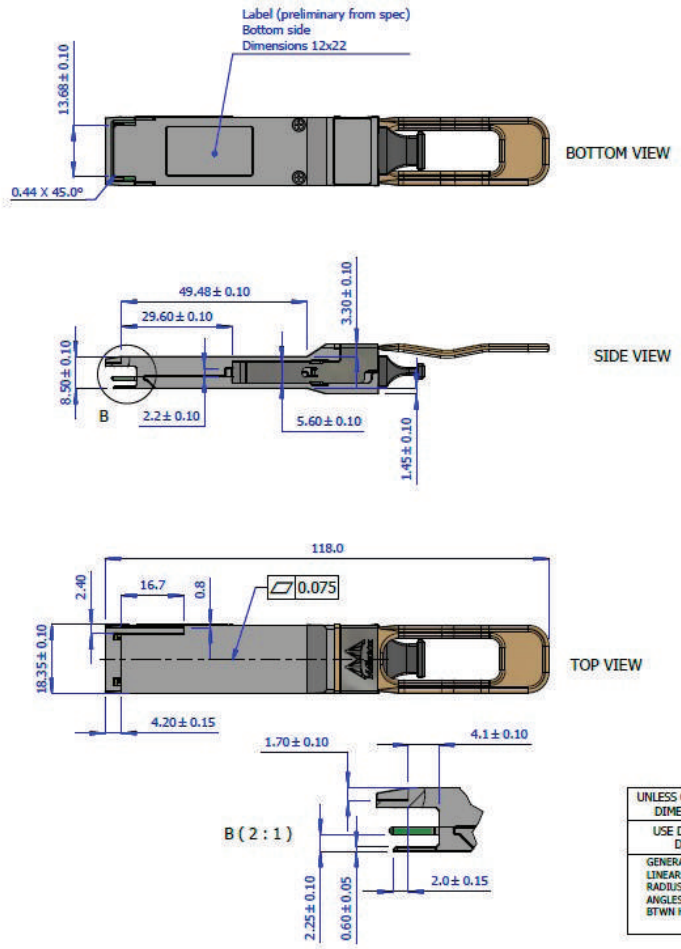
HIGHLIGHTS

- Up to 100 Gb/s data rate
- Selectable retiming for both Tx & Rx
- Programmable Tx input equalizer
- Programmable Rx output amplitude
- Programmable Rx output emphasis
- SFF-8665 compliant QSFP28
- Single 3.3 V supply, hot pluggable
- QSFP28 power class 3 (2.5 W max)
- 2.2 W power dissipation (typ, with retiming)
- BER better than 1E-15
- Class 1 laser safety
- Up to 100m on OM4 and 70m on OM3 multimode fiber at 100 Gb/s
- Up to 100m on OM3 at 40 Gb/s
- Hot pluggable
- RoHS compliant
- Applications:
  - 100GBASE-SR4 100G Ethernet
  - 40GBASE-SR4 40G Ethernet
  - Qualified for use in Mellanox Ethernet end-to-end systems

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Mechanical Schematics



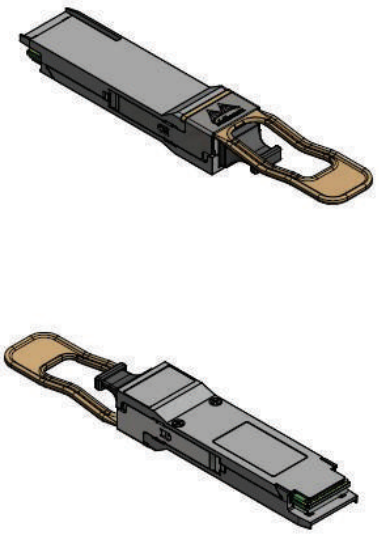


Table 3 - Part Number and Description

OPN	Description
MMA1B00-C100D	Mellanox® transceiver, 100GbE, QSFP28, MPO, 850nm, SR4, up to 100m, DDMI

Warranty Information

Mellanox LinkX optical transceivers include a 1-year limited hardware warranty, which covers parts repair or replacement.

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INTERCONNECT
PRODUCT BRIEF



100 GbE QSFP28 LR4 Optical Transceiver

MMA1L10-CR

LinkX †

NVIDIA® Mellanox® MMA1L10-CR is a 4-channel, pluggable, QSFP28, optical transceiver designed for use in 100 GbE links with up to 10 km reach on single mode fiber.

The transceiver is compliant with the QSFP28 MSA, IEEE 802.3ba 100GBASE-LR4, and IEEE 802.3bm CAUI-4 standards.

The MMA1L10-CR module converts 4 input channels of 25 Gb/s electrical data to 4 channels of LAN WDM optical signals at 4 different wavelengths and then multiplexes these into a single optical transmit signal. Reversely, on the receiver side the module de-multiplexes a 100 Gb/s optical LAN WDM input into 4 optical signals and then converts these to 4 electrical differential output signals.

MMA1L10-CR has selectable retiming as specified in the QSFP28 MSA. This enables the transceiver to be used in both 40 GbE and 100 GbE applications.

Digital diagnostic monitoring functions for temperature, supply voltage, and optical power are available via the two-wire (I^2C) management interface, as specified by the QSFP28 MSA.

The optical connector is a duplex LC/UPC (un-angled) connector intended for a pair of single mode fibers.

Rigorous production testing ensures the best out-of-the-box installation experience, performance, and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Units
Storage temperature	T_S	-40	85	°C
Operating case temperature	T_{OP}	0	70	°C
Maximum supply voltage	V_{CC}	-0.5	3.6	V
Relative humidity (non-condensation)	RH	15	85	%
Damage threshold, each lane	TH_d	5.5	---	dBm

Table 2 - Recommended Operating Conditions and Power Supply Requirements

Parameter	Symbol	Minimum	Typical	Maximum	Units
Supply voltage	V_{CCRx}, V_{CC1}, V_{CCTx}	3.135	---	3.465	V
Data rate, each lane	---	-100 ppm	25.78125	+ 100 ppm	Gbps
Link distance with G.652 rated fiber	Lmax	---	---	10	km

HIGHLIGHTS

- Hot pluggable QSFP28 MSA form factor
- IEEE 802.3ba 100GBASE-LR4 and IEEE 802.3bm CAUI-4 compliant
- Up to 10 km reach for Single Mode Fiber (SMF)
- Single +3.3 V supply, hot pluggable
- Operating case temperature: 0 °C to 70 °C
- 4 x 25.78 Gb/s DFB-based LAN-WDM transmitter
- 4 x 25.78 Gb/s retimed electrical interface
- QSFP28 Power Class 4 (3.5 W max)
- Duplex LC receptacles
- Hot pluggable
- RoHS compliant
- SFF-8636 compliant DDM functions
- Applications
  - 100GBASE-LR4 100G Ethernet
  - 40GBASE-LR4 40G Ethernet
  - Qualified for use in Mellanox Ethernet end-to-end systems

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Mechanical Schematics

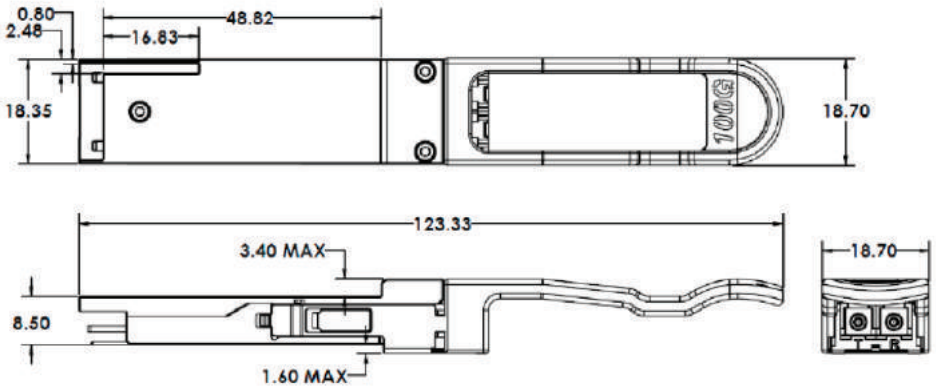


Table 4 - Part Number and Description

OPN	Description
MMA1L10-CR	Mellanox® optical transceiver, 100GbE, 100Gb/s, QSFP28, LC-LC, 1310nm, LR4 up to 10km

Warranty Information

Mellanox LinkX optical transceivers include a 1-year limited hardware warranty, which covers parts repair or replacement.

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INTERCONNECT
PRODUCT BRIEF



100 GbE QSFP28 CWDM4 Optical Transceiver

MMA1L30-CM

LinkX †

NVIDIA® Mellanox® MMA1L30-CM transceiver is a single mode, 4-channel (CWDM4), QSFP28, optical transceiver designed for use in 100 Gigabit Ethernet (GbE) links on up to 2 km of single mode fiber. It is also qualified for use in Mellanox InfiniBand EDR end-to-end systems.

Two options of the transceiver are available with identical functionality but with minor mechanical differences. The module (in both options) converts 4 input channels of 25 Gb/s electrical data to 4 channels of CWDM optical signals and then multiplexes them into a single fiber, using a nominal wavelength of 1310 nm, for 100 Gb/s optical transmission. Reversely on the receiver side, the 100 Gb/s optical input is demultiplexed into 4 channels of CWDM optical signals and then converted to 4 output channels of electrical data.

MMA1L30-CM has selectable retiming as specified in the SFF-8636 MSA. This enables the transceiver to be used in both 40 GbE and 100 GbE applications.

Digital diagnostic monitoring functions for temperature, supply voltage, and optical power are available via the two-wire (I^2C) management interface, as specified by the QSFP28 MSA.

The optical connector is a duplex LC/UPC (un-angled) connector intended for a pair of single mode fibers.

Rigorous production testing ensures the best out-of-the-box installation experience, performance, and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Units
Storage Temperature	T_S	-40	85	°C
Operating Case Temperature	T_{OP}	0	70	°C
Supply Voltage	Vcc	-0.5	3.6	V
Relative Humidity (non-condensing): Option 1 Option 2	RH	5 15	95 85	%
Control Input Voltage	V_I	-0.3	Vcc+0.5	V
Control Output Voltage	I_O	-20	20	mA

Table 2 - Recommended Operating Conditions and Power Supply Requirements

Parameter	Symbol	Min	Typical	Max	Units
Power Supply Voltage	Vcc	3.135	3.3	3.465	V
Data Rate, each lane	--	-100 ppm	25.78	+100 ppm	Gb/s
Control Input Voltage High	V_{IH}	Vcc*0.7	--	Vcc +0.3	V
Control Input Voltage Low	V_{IL}	-0.3	--	Vcc*0.3	V
Power Supply Noise Tolerance (10 Hz - 10 MHz)	--	--	--	66	mVpp
Rx Differential Data Output Load	--	--	100	--	Ω
Link Distance with G.652 rated fiber	Lmax	2	--	2000	m

HIGHLIGHTS

- Up to 100 Gb/s data rate
- SFF-8665 compliant QSFP28
- CWDM4 MSA Revision 1.1 compliant
- Single 3.3 V supply, hot pluggable
- QSFP28 power class 4 (3.5 W max)
- Operating case temperature: 0 °C to 70 °C
- Duplex LC connector
- Up to 2 km reach on single mode fiber at 100 Gb/s
- 40 Gb/s operation for backward compatibility
- Two Wire Serial Interface with Digital Diagnostic Monitoring
- RoHS compliant
- Applications
  - IEEE 802.3bm CAUI-4 100G Ethernet
  - Qualified for use in Mellanox Ethernet and InfiniBand end-to-end systems

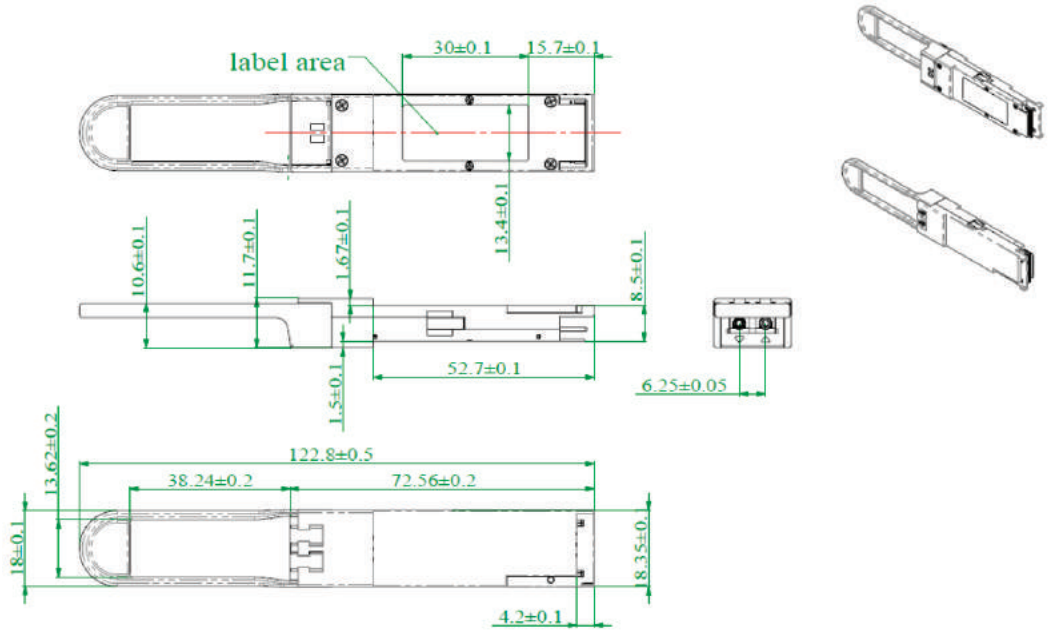
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Mechanical Schematics

Note: Multiple options are specified to ensure supply chain robustness. The provided option depends on availability and may change from shipment to shipment.

Option 1:



Option 2:

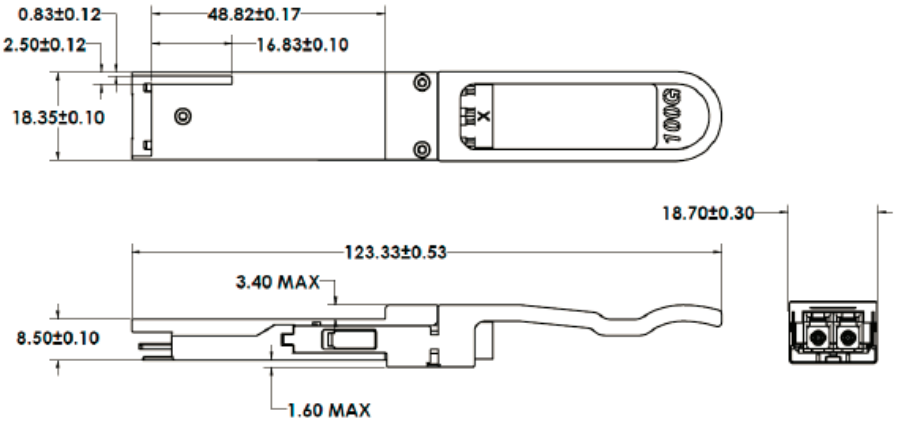


Table 3 - Part Number and Description

OPN	Description
MMA1L30-CM	Mellanox® optical module, 100GbE, 100Gb/s, QSFP28, LC-LC, 1310nm, CWDM4, up to 2km. Note: Option 1 and Option 2 transceivers have the same ordering part number, and are differentiated by Country of Origin and by means of the product's alphanumeric revision.

Warranty Information

Mellanox LinkX optical transceivers include a 1-year limited hardware warranty, which covers parts repair or replacement.

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INTERCONNECT
PRODUCT BRIEF



200GbE QSFP56 MMF Transceiver

MMA1T00-VS

LinkX †

Mellanox® MMA1T00-VS transceiver is a 4-channel, pluggable, QSFP56, optical transceiver designed for use in 200GbE Ethernet applications. This module incorporates Mellanox integrated circuit technology in order to provide high performance. The transceiver operates over 4-lane parallel multi-mode fiber (MMF), using a nominal wavelength of 850nm, and is QSFP56 MSA compliant.

The transceiver has a standard SFF-8665 compliant QSFP56 connector on the electrical side towards the host system. The optical interface is composed of four optical channels/fibers in each direction, intended for a parallel multi-mode optical cable via a standard MPO-12 UPC connector. Each channel/fiber operates at signaling rates up to 26.5625 GBd. Rigorous production testing ensures the best out-of-the-box installation experience, performance and durability.

The MMA1T00-VS transceiver has Digital Diagnostic Monitoring functions for supply voltage, temperature, laser bias current, optical transmit and receive levels with associated warning and alarm thresholds.

The MMA1T00-VS transceiver will work with a fiber plant as specified in the QSFP MSA standard.

Table 1 - Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply voltage	-0.3	3.6	V
Data input voltage	-0.3	3.465	V
Control input voltage	-0.3	4.0	V
Damage threshold	3.4	---	dBm
Storage temperature	-40	85	°C

Table 2 - Operational Information

Parameter	Minimum	Typical	Maximum	Units
Supply voltage (Vcc)	3.135	3.3	3.465	V
Power dissipation (each end, retiming on all lanes)	---	4.5	5.0	W
Supply noise tolerance (10Hz-10MHz)	66	---	---	mVpp
Operating case temperature	0	---	70	°C
Operating relative humidity	5	---	85	%

HIGHLIGHTS

- Up to 200Gb/s data rate
- Up to 100m on OM4 and 70m on OM3 multimode fiber at 200Gb/s
- 4x 50Gb/s PAM4 modulation
- Programmable Rx output amplitude and emphasis
- Adaptive Tx input equalizer
- SFF-8665 compliant QSFP56 port
- SFF-8636 DDM compliant
- Single 3.3V power supply
- 4.5W power dissipation
- BER better than 1E-15 with Mellanox systems
- QSFP56 power class 5
- Class 1 laser safety
- Hot pluggable
- RoHS compliant
- IEEE 802.3 200GAUI-4 / 200GBASE-SR4 compliant
- MPO-12 UPC male receptacle connector
- SFF-8636 compliant I²C management interface

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Mechanical Schematics

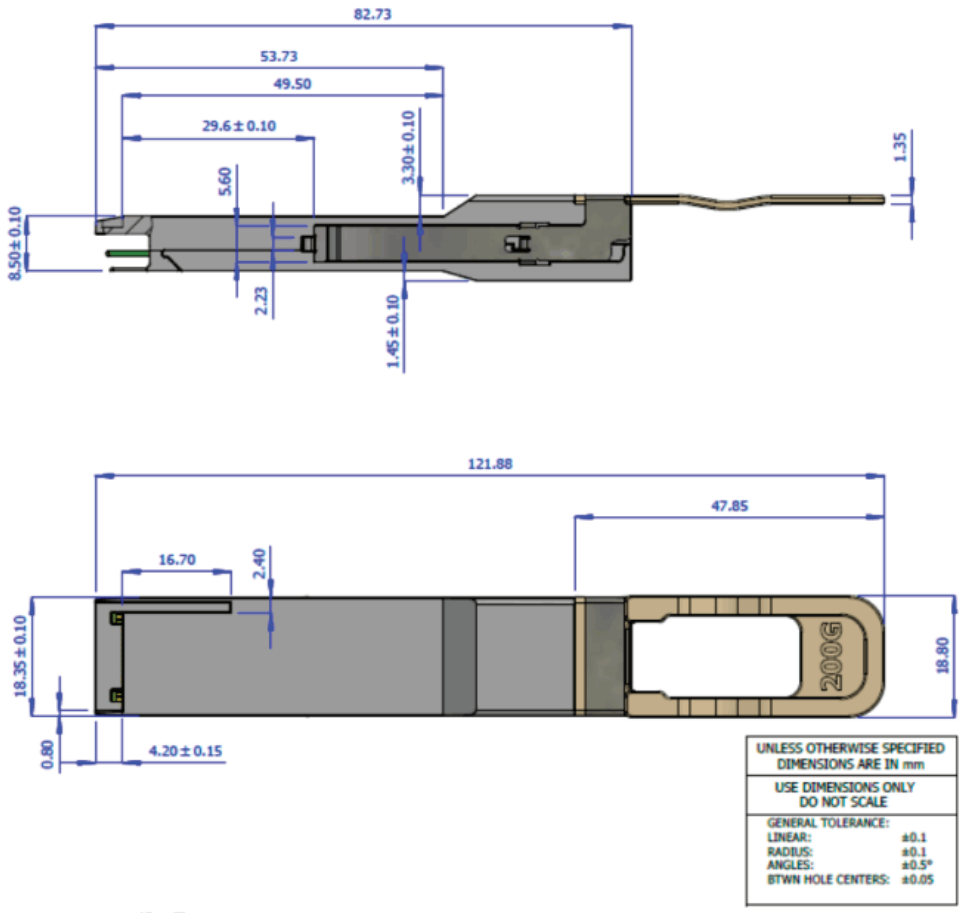


Table 3 - Part Number and Description

OPN	Description
MMA1T00-VS	Mellanox® transceiver, 200GbE, up to 200Gb/s, QSFP56, MPO, 850nm, SR4, up to 100m

Warranty Information

Mellanox LinkX transceivers include a 1-year limited hardware warranty, which covers parts repair or replacement.

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25GbE SFP28 LR Optical Transceiver

LinkX †

MMA2L20-AR

Mellanox® 25Gb/s transceiver module is designed for optical communication applications and is compliant to 25GBASE-LR of the IEEE 802.3cc standard. The central wavelength is 1310nm. The high performance transmitter and high sensitivity PIN receiver provide superior performance for 25 Gigabit Ethernet applications with up to 10km links and compliant to optical interface with IEEE802.3cc.

The product is designed with a form factor, optical/electrical connection and digital diagnostic interface according to the SFP28 Multi-Source Agreement (MSA).

Table 1 - Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Units
Storage Temperature	T_S	-40	85	°C
Operating Case Temperature	T_{OP}	0	70	°C
Power Supply Voltage	V_{CCRx}, V_{CC1}, V_{CCTx}	0	3.6	V
Relative Humidity (non-condensation)	RH	5	85	%
Damage Threshold	TH_D	3.5	---	dBm

Table 2 - Operational Conditions and Power Supply Requirements

Parameter	Symbol	Minimum	Typical	Maximum	Units
Operating Case Temperature	T_{OP}	0	---	70	C
Power Supply Voltage	V_{CCRx}, V_{CC1}, V_{CCTx}	3.135	3.3	3.465	V
Data Rate	---	-100ppm	25.78125	+100ppm	Gbps
Control Input Voltage High	V_{CTLH}	2.0	---	Vcc	V
Control Input Voltage Low	V_{CTLL}	0.0	---	0.8	V
Link Distance with ITU-T G.652.D rated fiber	D	0.002	---	10	km

HIGHLIGHTS

- Hot pluggable SFP28 MSA form factor
- Compliant to IEEE 802.3cc 25GBASE-LR
- SFF-8402 compliant
- Up to 10km reach for G.652 SMF
- Single +3.3V power supply
- Operating case temperature of 0-70°C
- Transmitter: 25Gb/s DFB (1310nm)
- Receiver: 25Gb/s PIN
- 28G electrical serial interface (CEI-28G-VSR)
- Maximum power consumption 1.0W
- Duplex LC receptacle
- RoHS compliant
- SFF-8472 compliant DDM functions

Applications

- 25GBASE-LR Ethernet links
- Client-side 25G telecom connections

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Table 3 - Electrical Module Specifications

Parameter	Symbol	Minimum	Typical	Maximum	Units	Notes
Power Consumption	---	---	---	1.0	W	
Transmitter						
Differential Input Voltage Swing	$V_{IN,PP}$	200	---	800	mVpp	
Differential Input Impedance	Z_{IN}	---	100	---	Ohm	
Receiver						
Differential Output Voltage Swing	$V_{OUT,PP}$	200	---	900	mVpp	2
Differential Output Impedance	Z_{OUT}	---	100	---	Ohm	

Notes:
1. Power-on Initialization Time is the time from when the supply voltages reach and remain above the minimum specified operating supply voltages to the time when the module is fully functional.
2. IEEE 802.3bm 83E.3.4.1; requires optimization of the input equalizer.

Mechanical Schematics

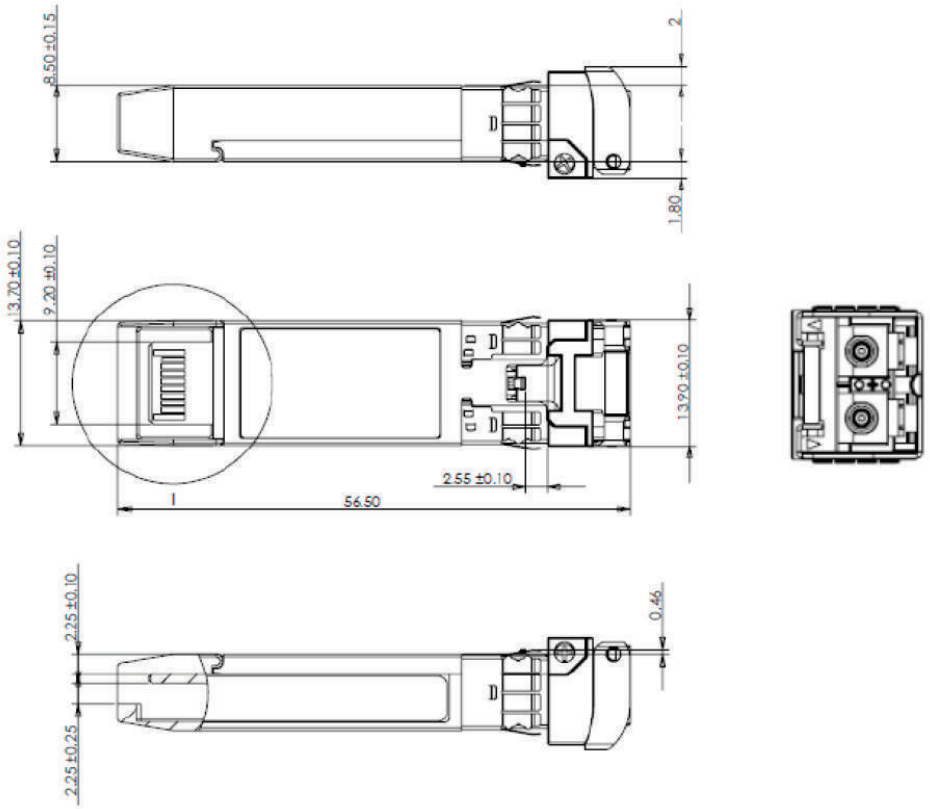


Table 4 - Part Number and Description

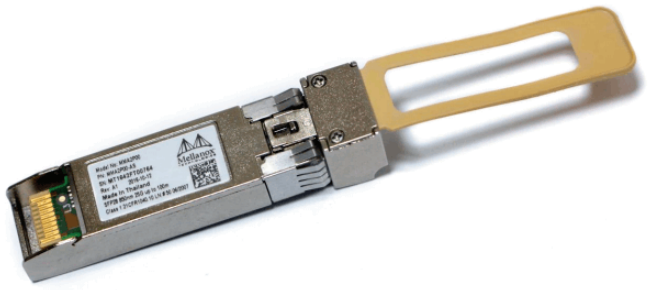
OPN	Description
MMA2L20-AR	Mellanox® optical transceiver, 25GbE, 25Gb/s , SFP28, LC-LC, 1310nm, LR up to 10km

Warranty Information

Mellanox LinkX optical transceivers include a 1-year limited hardware warranty, which covers parts repair or replacement.

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25GbE SR SFP28 MMF Optical Transceiver

LinkX †

MMA2P00-AS | MMA2P00-ASHT

Mellanox® MMA2P00-AS/MMA2P00-ASHT is a pluggable SFP28 optical transceiver designed for use in 25GbE Ethernet. It incorporates Mellanox integrated circuit technology in order to provide high performance at low power. The transceiver operates over a pair of multi-mode fibers (MMF), using a nominal wavelength of 850nm, and is SFF-8402 compliant.

MMA2P00-AS/MMA2P00-ASHT has a standard SFP28 connector on the electrical side towards the host system supporting IEEE 802.3bm. The optical interface is composed of two optical channels/fibers, one in each direction, intended for a multi-mode optical cable connected via standard LC connectors. Each channel/fiber operates at signaling rates up to 25.78125GBd.

The transceiver offers selectable retiming for both its optical transmitter and receiver for the 25Gb/s rate, and it also supports lower bit rates without. The transmitter has programmable input equalizers and input squelch function, while the receiver has programmable output amplitude and pre-emphasis.

Rigorous production testing ensures the best out-of-the-box installation experience, performance, and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply voltage	-0.3	3.6	V
Data input voltage	-0.3	3.465	V
Control input voltage	-0.3	4	V
Damage threshold	3.4	---	dBm
Storage temperature	-40	85	°C

Table 2 - Operational Module Information

Parameter	Minimum	Typical	Maximum	Units
Supply voltage	3.135	3.3	3.465	V
Power dissipation (no retiming)	---	0.45	0.5	W
Power dissipation (retiming)	---	0.7	0.8	W
Supply noise tolerance (10Hz-10MHz)	---	---	66	mVpp
Operating case temperature of MMA2P00-AS	0	---	70 (1)	°C
Operating case temperature of MMA2P00-ASHT	0	---	85 (2)	°C
Operating relative humidity	5	---	85	%

Notes: 1. Internal temperature readout through DDMI of up to 75°C is allowed. 2. Internal temperature readout through DDMI of up to 90°C is allowed.

HIGHLIGHTS

- Selectable retiming for both Tx and Rx
- Programmable Rx output emphasis
- Programmable Tx input equalizer
- SFF-8402 compliant SFP28
- 3.3V power supply
- SFP28 power level 1
- 0.7W power dissipation (typ., with retiming)
- BER better than 1E-15
- 0°C-85°C extended operating case temperature range (MMA2P00-ASHT only)
- Class 1 laser safety
- Up to 100m on OM4 and 70m on OM3 multimode fiber at 25Gb/s
- Up to 100m on OM3 at 10Gb/s
- Hot pluggable
- RoHS compliant
- IEEE 802.3 25GBASE-SR compliant
- IEEE 802.3 10GBASE-SR compliant
- SFF-8472 compliant I²C management interface
- 25G to 10G rate selection by turning off CDR

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Mechanical Schematics

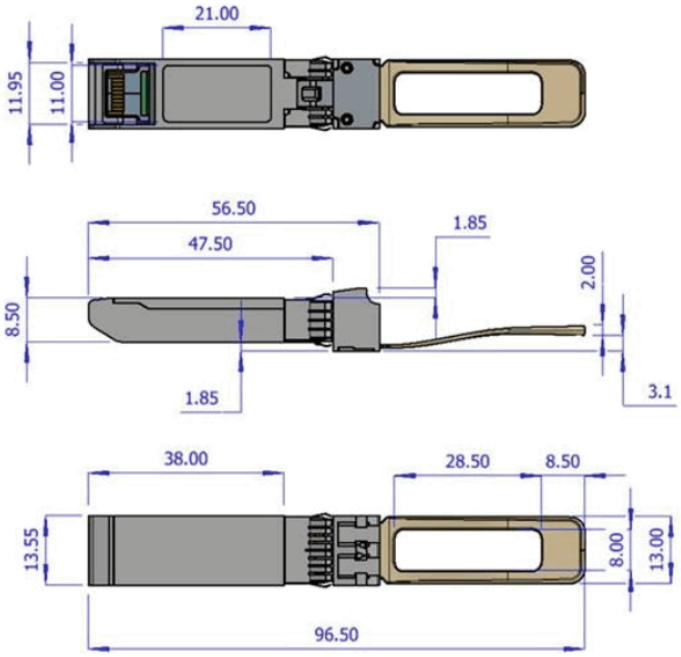


Table 3 - Part Number and Description

OPN	Description
MMA2P00-AS	Mellanox® transceiver, 25GbE, SFP28, LC-LC, 850nm, up to 100m
MMA2P00-ASHT	Mellanox® transceiver, 25GbE, SFP28, LC-LC, 850nm, SR, 85C, up to 100m

Warranty Information

Mellanox LinkX optical transceivers include a 1-year limited hardware warranty, which covers parts repair or replacement.

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INTERCONNECT
PRODUCT BRIEF



100 GbE QSFP28 PSM4 Optical Transceiver

MMS1C10-CM

LinkX †

NVIDIA® Mellanox® MMS1C10-CM transceiver is a parallel single mode, 4-channel (PSM4), pluggable, QSFP28, optical transceiver designed for use in 100 GbE Ethernet applications.

This module incorporates a state-of-the-art uncooled DFB laser and integrated circuit technology, in order to provide high performance operation. The transceiver operates over 2x4-lane parallel single mode fiber (SMF), using a nominal wavelength of 1310 nm in compliance with the 100G PSM4 MSA.

The transceiver is SFF-8665 compliant, i.e. it has a standard QSFP28 connector on the electrical side towards the host system, single 3.3 V supply, hot pluggable, and two-wire serial management interface.

The transceiver has Digital Diagnostic Monitoring (DDM) functions for supply voltage, temperature, laser bias current, optical transmit and receive levels with associated warning and alarm thresholds.

Adjustment of the Tx input equalizer, Rx output amplitude/emphasis, and (de)selection of retiming is controlled via registers defined in the SFF-8636 standard.

The optical interface is composed of four optical channels/fibers in each direction, intended for a parallel single-mode optical cable via a standard MPO/APC connector.

Rigorous production testing ensures the best out-of-the-box installation experience, performance and durability.

Table 1 - Absolute Maximum Ratings

Parameter	Symbol	Conditions	Minimum	Maximum	Units
Storage Temperature	Ts	---	-40	+85	°C
Relative Humidity	RH	Non condensing	0	85	%
Supply Voltage	Vcc	---	0	3.6	V

Table 2 - Operational Information

Parameter	Symbol	Minimum	Typical	Maximum	Units
Operating Case Temperature	Tc	-5	---	70	°C
Supply Voltage	Vcc	3.13	3.3	3.47	V
Supply Current	Icc	---	---	1000	mA
Data Rate, each lane	DR	-100 ppm	25.78	+100 ppm	Gb/s
Link Distance	Lmax	2	---	500	m

HIGHLIGHTS

- Up to 100 Gb/s data rate
- Up to 500 m reach over single mode fiber at 100 Gb/s
- Selectable retiming enabling 40G operation
- SFF-8665 compliant
- 3.3 V power supply
- QSFP28 Power Class 4 (<3.5 W)
- Class 1 laser safety
- Hot pluggable
- RoHS, UL & TÜV compliant
- 100G-PSM4 compliant
- SFF-8636 compliant two wire interface with Digital Diagnostic Monitoring
- Applications
  - IEEE 802.3bm CAUI-4 100G Ethernet
  - 100G and 40G Ethernet on PSM4 (Parallel Single Mode 2x4-Fiber) links
  - Qualified for use in Mellanox Ethernet end-to-end systems

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† For illustration only. Actual products may vary.

Table 3 -Transmitter Electrical Specifications (each lane)

Parameter	Symbol	Notes	Minimum	Typical	Maximum	Units
Differential Data Input Amplitude	$V_{CML, DI}$	peak-peak	200	---	1000	mVpp
Differential Input Impedance	R_{DI}	---	---	100	---	Ohm
LPMode, ResetL and ModSelL	V_{IL}	LVTTL	-0.3	---	0.8	V
	V_{IH}		2	---	Vcc+0.3	V

Table 4 - Receiver Electrical Specifications (each lane)

Parameter	Symbol	Notes	Minimum	Typical	Maximum	Units
Differential Data Output Amplitude	$V_{CML, DO}$	peak-peak	300	---	800	mVpp
Differential Output Impedance		---	---	100	---	Ohm
ModPrsL and IntL	V_{OL}	---	0	---	0.4	V
	V_{OH}	---	Vcc-0.5	---	Vcc+0.3	V

Mechanical Schematics

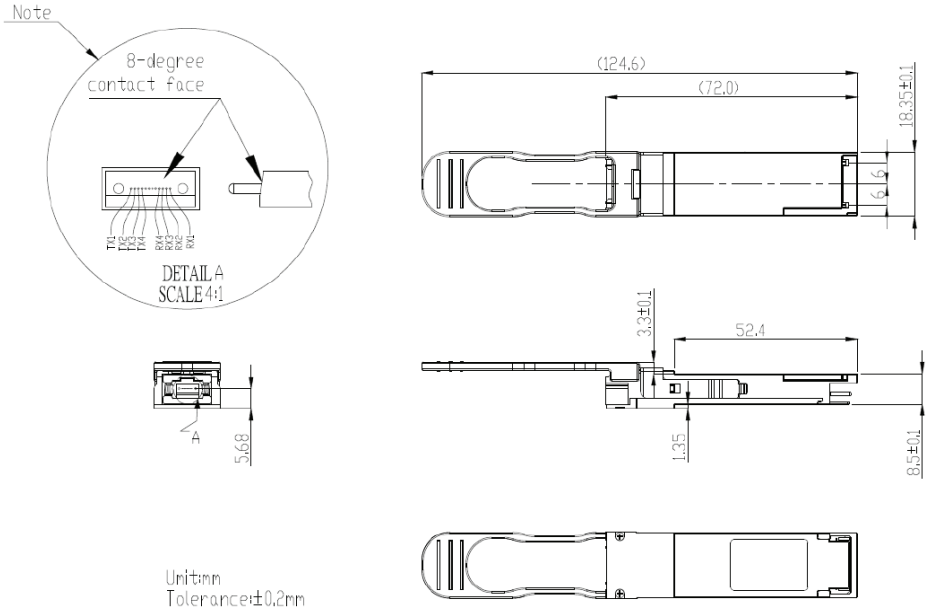


Table 5 - Part Number and Description

OPN	Description
MMS1C10-CM	Mellanox® active optical module, 100Gb/s, QSFP, MPO, 1310nm, PSM4

Warranty Information

Mellanox LinkX optical transceivers include a 1-year limited hardware warranty, which covers parts repair or replacement.

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