



TYPE

**MCIO Series
PRODUCT SPECIFICATION**

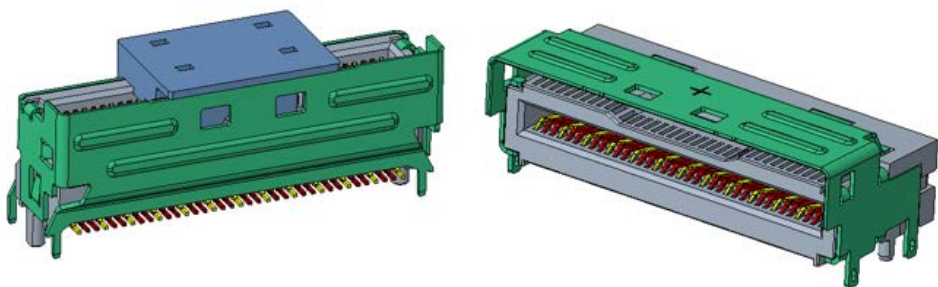
SPEC. NO
ES-11-00-00XX

Revision.
X8.1

Date
6/15/2024

Page
1 / 11

MCIO™ SERIES CONNECTOR



Prepared by:

Andi Wu

Check by:

Kais Song

Approved by:

Hongji Chen

Date:

4/10/2026

Date:

4/10/2026

Date:

4/10/2026



TYPE

**MCIO Series
PRODUCT SPECIFICATION**

SPEC. NO

ES-11-00-00XX

Revision.

X8.1

Date

6/15/2024

Page

2 / 11

1 SCOPE

This specification defines the performance, tests, quality and reliability requirements of the [MCIO™ Series Connector](#) product.

2 APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, latest edition of the specification applies. In the event of conflict between requirements of this specification and product drawing, product drawing shall take precedence.

2.1 Industry standards

[List applicable specifications that are referenced in the specification e.g.:](#)

2.1.1 Flammability: UL94V-0 or similar applicable specification

2.1.2 EIA 364: Electrical Connector/Socket Test Procedures Including Environmental Classifications.

3 MECHANIC DIMENSIONS**3.1 Dimensions:**

Refer to engineering drawing

4 REQUIREMENTS**4.1 Qualification**

Connectors furnished under this specification shall be capable of meeting the qualification test requirements specified herein. Unless otherwise specified, all measurements shall be performed within the following lab conditions:

a. Temperature: 25°C±10°C.

b. Relative Humidity: 20% to 80%

c. Atmospheric Pressure: 650mm to 800mm of Hg (86 ~106Kpa)

4.2 Materials

a. Contacts: [Copper and Copper alloy](#).

b. Insulator: [High temperature Engineering plastics, UL94 V-0](#).

c. Other material: [Metal](#)

4.3 Finish

Plated finished for qualification components shall be meet the connector's application.



TYPE

**MCIO Series
PRODUCT SPECIFICATION**

SPEC. NO

ES-11-00-00XX

Revision.

X8.1

Date

6/15/2024

Page

3 / 11

4.4 Workmanship

Connectors shall be uniform in quality and shall be free from burrs, scratches, cracks, voids, chips, blisters, sharp edges, and other defects that will that may impair performance.

4.5 Differential Impedance: 85 ohms or 92 ohms.**5 RATING**

5.1 Operating Voltage Rating = 30 VDC/Per Contact

5.2 Operating Temperature Range = -40° C to +85° C (°C)

5.3 Non-Operating Temperature Range = -55° C to +85° C (°C)

6 ELECTRICAL CHARACTERISTIC**6.1 Current Rating**

The temperature rise above ambient shall not exceed 30°C at any point in the system when there are up to a maximum of 6 adjacent contacts per side, 12 contacts total energized. The following details shall apply:

- a. Ambient Conditions – Still air at 25°C
- b. Test configuration – mechanically attached to the base of the header mating contacts
- c. Copper trace weight: -1 oz
- d. Reference EIA-364-70

6.2 Low Level Contact Resistance (LLCR)

The low level contact resistance shall not initially exceed 20 milliohms. The low level contact resistance shall also not exceed 20 milliohms increase in resistance (from the initial measurement) after any treatment and/or environmental exposure.

Measurements shall be in accordance with EIA-364-23.

The following details shall apply:

- a. Test Voltage – 20 milli-volts DC max open circuit.
- b. Test Current – Not to exceed 100 milli-amperes.
- c. Number of readings: 500 minimum



TYPE

**MCIO Series
PRODUCT SPECIFICATION**

SPEC. NO

ES-11-00-00XX

Revision.

X8.1

Date

6/15/2024

Page

4 / 11

6.3 Insulation Resistance

The insulation resistance of mated connectors shall not be less than 1000M ohms.

Measurements shall be in accordance with EIA-364-21.

The following details shall apply:

- a. Test Voltage – 500 volts DC (Sig-Sig & Sig-Grd),
- b. Electrification Time – 1 minutes, unless otherwise specified.
- c. Points of Measurement – Between adjacent contacts and between ground contacts within a column.

6.4 Dielectric Withstanding voltage

There shall be no evidence of arc-over, insulation breakdown, or excessive leakage current > 0.5 milliampere when mated connectors are tested in accordance with EIA-364-20.

The following details shall apply:

- a. Test Voltage – 300 volts (Sig-Sig & Sig-Grd), DC.
- b. Test Duration – 60 seconds.
- c. Test Condition – 1 (685~785mm of mercury – sea level).
- d. Points of Measurement – Between adjacent contacts and ground contacts within a column.

7 MECHANICAL CHARACTERISTICS

7.1 Durability(preconditioning)

Mating and un-mating with applicable Plug_Cable assembly, Durability tested in accordance with EIA-364-09.

The following details shall apply:

- a. Number of Cycles: 50 cycles.
- b. Cycling Rates: 500±50 cycles/hour

7.2 Durability

Mating and un-mating with applicable Plug_Cable assembly, Durability tested in accordance with EIA-364-09.



TYPE

**MCIO Series
PRODUCT SPECIFICATION**SPEC. NO
ES-11-00-00XXRevision.
X8.1Date
6/15/2024Page
5 / 11

The following details shall apply:

- a. Number of Cycles: **200** cycles.
- b. Cycling Rates: **500±50** cycles/hour

7.3 Mating/un-mating Force:

The force to mate a receptacle connector and plug/ cable assembly. Shall not exceed **1.1 N/contact pair +10N Max.;** The unmating force shall not be less than **0.1 N/contact pair Min. ;**

The following details shall apply:

- a. Cross Head Speed – **25.4** mm or inch per minute.
- b. Utilize free floating fixtures.
- c. Reference EIA-364-13.

7.4 Active Latch Retention Strength

Measure force necessary to remove module from Cable assembly with latches enabled .

- a. Force: 50N Min per Plug Cable assembly.
- b. Requirement: No functional damage to Plug/Cable assembly.

7.5 Wrenching strength (W/ mated Cable- Passive Latch)

Bend cable 90° at minimum bend radius. Pull in 4 axis directions for round cable. Pull in 2 axis directions for flat cable. No damage to plug/ cable assembly.

- a. Force: 25N Min per Plug Cable.
- b. Requirement: No functional damage to plug/ cable assembly.

7.6 Wrenching strength (W/ mated Cable- Active Latch)

Bend cable 90° at minimum bend radius. Pull in 4 axis directions for round cable. Pull in 2 axis directions for flat cable. No damage to plug/ cable assembly.

- a. Force: 40N Min per Plug Cable.
- b. Requirement: No functional damage to plug/ cable assembly..

7.7 Contact Normal force(EIA-364-04)

- a. Force: 0.49 N (50 grams) minimum at nominal.
- b. Rate: 25.4 mm/minute

7.8 Vibration(EIA-364-28, Test Condition VII, Condition D)

Subject mated specimens to 3.10 G's rms between 20-500 Hz for 15 minutes in each of 3 mutually perpendicular planes.



TYPE

**MCIO Series
PRODUCT SPECIFICATION**

SPEC. NO

ES-11-00-00XX

Revision.

X8.1

Date

6/15/2024

Page

6 / 11

- a. No discontinuity longer than 1usec allowed.
- b. 20 mOhms maximum change from initial (baseline) contact resistance
- c. No Damage

7.9 Mechanical Shock(EIA-364-27, Test Condition H)

Subject mated specimens to 50 G's half-sine shock pulses of 11 milliseconds duration. 3 shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks.

- a. No discontinuity longer than 1usec allowed
- b. 20 mOhms maximum change from initial (baseline) contact resistance

7.10 Reseating

- a. Test condition: Manually mating and un-mating the connector with applicable Wafer.Durability tested in accordance with EIA-364-09.
- b. Requirement: Perform 25 such cycles.

8 ENVIRONMENTAL CHARACTERISTICS

After exposure to the following environmental conditions in accordance with the specified test procedure and/or details, the product shall show no physical damage and shall meet the electrical and mechanical requirements per paragraphs 6.0 and 7.0 as specified in the Table 1 test sequences. Unless specified otherwise, assemblies shall be mated during exposure.

8.1 Thermal Shock EIA-364-32.

- a. Number of Cycles – 10 cycles
- b. Temperature Range – Between -55 °C and 85 °C
- c. Time at Each Temperature – 30 minutes
- d. Transfer Time – 30 minutes, maximum
- e. No Damage
- f. 20 mOhms maximum change from initial (baseline) contact resistance

8.2 Humidity EIA-364-31 method III (cyclic temperature)

Subject unmated specimens to 24 cycles between 25°C/ 80%RH and 65°C/ 50%RH
Ramp times should be 0.5 hour and dwell times should be 1.0 hour

- a. No Damage
- b. 20 mOhms maximum change from initial (baseline) contact resistance

8.3 Temperature Life(preconditioning).

No physical damage shall be observed after tested in accordance with EIA-364-17.

The following details shall apply:

- Test Duration: 72 hours.
- Temperature: 105 °C±2°C.
- No Damage.

8.4 Temperature Life.

No physical damage shall be observed after tested in accordance with EIA-364-17.

The following details shall apply:

- Test Duration: 228 hours.
- Temperature: 105 °C±2°C.
- No Damage.
- 20 mOhms maximum change from initial (baseline) contact resistance.

8.5 Mixed Flowing Gas corrosion (MFG) EIA-364-65

- Class – IIA
- Duration – 7 days
- Specify mated only, unmated only, or unmated for ½ the duration and mated the remaining ½ duration
- No evidence of physical damage

8.6 Solderability (EIA-364-52)

The surfaces to be tested shall be immersed in the flux for a minimum of 5 to 10 seconds. Any droplets of flux that may form shall be removed by blotting, taking care not to remove the flux coating from the surfaces to be tested. The test samples being tested shall be allowed to dry in ambient air for 5 to 20 seconds prior to solder immersion. The test sample termination shall be immersed to a depth equal to a length from its tip to a location normally not less than 0.5 mm below the connector seating plane.

- Temperature: 245 ± 5°C
- Duration: 5 seconds
- 95% of immersed area must show no voids or pin holes.

8.7 Resistance to soldering heat (Infrared reflow)(EIA-364-56)

- Test condition : Average ramp rate: 1~4°C per second, Temperature(board surface): 250 +10°C/-0°C



TYPE

**MCIO Series
PRODUCT SPECIFICATION**

SPEC. NO

ES-11-00-00XX

Revision.

X8.1

Date

6/15/2024

Page

8 / 11

- b. Test Duration : 30~35 seconds
- c. No evidence of physical damage.

8.8 Salt Spray EIA-364-26

- a. Test Condition – B (refer to specified test method for condition)
- b. Duration – 48 (hours if not specified by selected condition above)
- c. Acceptance criteria – (visual examination requirements and/or LLCR criteria)

9 QUALITY ASSURANCE PROVISIONS**9.1 Equipment Calibration**

All test equipment and inspection facilities used in the performance of any test shall be maintained in a calibration system in accordance with MIL-C-45662 and ISO 9000.

9.2 Inspection Condition

Unless otherwise specified herein, all inspections shall be performed under the following ambient conditions:

- a) Temperature: 25°C±10 °C.
- b) Relative Humidity : 20% to 80%
- c) Atmospheric Pressure : 650mm to 800mm of Hg (86 ~106Kpa)

9.3 Sample Quantity and Description

The sample size to be tested in each group shown in Qualification Testing Sequences should follow Table 1; All samples must be free of defects that would impair normal connector operation. All samples must meet dimensional requirements of connector.

9.4 Acceptance

9.4.1 Electrical and mechanical requirements placed on test samples as indicated in Paragraphs 6 and Paragraphs 7 shall be established from test data using appropriate statistical techniques or shall otherwise be customer specified, and all samples tested in accordance with this product specification shall meet the stated requirements.

9.4.2 Failures attributed to equipment, test set up, or operator error shall not disqualify the product. If product failure occurs, corrective actions shall not disqualify the product. If product failure occurs, corrective action shall be taken and samples resubmitted for qualification.



TYPE	MCIO Series PRODUCT SPECIFICATION		SPEC. NO ES-11-00-00XX	Revision. X8.1
			Date 6/15/2024	Page 9 / 11

9.5 Qualification Testing

Qualification testing shall be performed on sample units produced with equipment and procedures, normally used in production. The test sequence shall be as shown in Qualification Testing Sequences Visual Examination: EIA 364-18

9.6 Re-qualification Testing

If any of the following conditions occur, the responsible product engineer shall initiate re-qualification testing consisting of all applicable parts of the qualification test matrix Table 1.

9.6.1 A significant design change is made to the existing product which impacts the product form, fit or function. Examples of significant changes shall include, but not be limited to, changes in the plating material composition or thickness, contact force, contact surface geometry, insulator design, contact base material, or contact lubrication requirements.

9.6.2 A significant change is made to the manufacturing process, which impacts the product form, fit or function.

9.6.3 A significant event occurs during production or end use requiring corrective action to be taken relative to the product design or manufacturing process.

10 QUALIFICATION TESTING SEQUENCES

Table 1



TYPE

**MCIO Series
PRODUCT SPECIFICATION**SPEC. NO
ES-11-00-00XXRevision.
X8.1Date
6/15/2024Page
10 / 11**QUALIFICATION TEST**

No.	Description	Item	Test Group & Sequence											
			A	B	C	D	E	F	G	H	I	J	K	L
1.	Examination of connector(s)	4.4	1,6	1	1,7	1,5	1,9	1,3	1,3	1,4	1,3	1,3	1,3	1,3
2.	Low Level Contact Resistance	6.2	2,7	5,9,13	4, 8	2,6	5,8							
3.	Insulation Resistance	6.3			3,9									
4.	Dielectric Withstanding Voltage	6.4			2,10									
5.	Temperature Rise	6.1							2					
6.	Durability (preconditioning)	7.1												
7.	Durability	7.2		6										
8.	Mating Force (Plug only)	7.3		3,7			3,							
9.	Un-mating Force (Plug only)	7.3		4,8			4,							
10.	Contact Normal Force	7.7						2						
11.	Vibration	7.8	5											
12.	Mechanical Shock	7.9	4											
13.	Reseating	7.10	3	2,11		3	2							
14.	Thermal Shock	8.1		10	5									
15.	Humidity-Temperature Cycling	8.2		12	6		6							
16.	Temperature life (preconditioning)	8.3												
17.	Temperature life	8.4					7							
18.	Mixed flowing gas (MFG)	8.5				4								
19.	Solder ability	8.6								2				
20.	Resistance to soldering heat (Infrared reflow)	8.7								3				
21.	Wrenching strength (W/ mated Cable-Passive Latch)	7.5									2			
22.	Wrenching strength (W/ mated Cable-Active Latch)	7.6										2		
23.	Active latch retention force	7.4									2			
24.	Salt Spray	8.8												2



TYPE

**MCIO Series
PRODUCT SPECIFICATION**

SPEC. NO

ES-11-00-00XX

Revision.

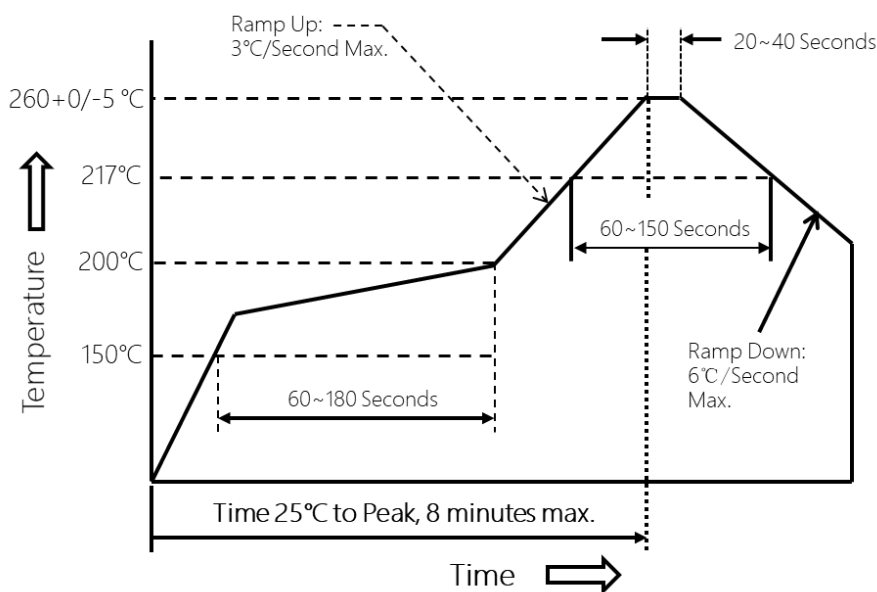
X8.1

Date

6/15/2024

Page

11 / 11



Recommended Reflow Curve Pb-Free Process

REVISION RECORD

Rev	Page	Description	EC#	Date
X1	All	Release specification		2020.05.11
X2	All	Updated the number of current pins from the SFF		2021.04.14
X3	9.10	Updated the qualification testing sequences		2021.06.18
X4	3	Add the differential impedance		2021.07.14
X5	9.10	Updated the qualification testing sequences		2022.07.04
X6	All	Update section 7.2、7.3、8.4		2022.09.22
X7	3,11	Update section 6.2,Add furnace temperature curve		2023.08.18
X8	6.4	Update section 6.4		2023.06.15
X8.1	7.9	Update section 7.9		2026.04.10